

Test Specifications Fuel Injection Pumps and Governors

WPP 001/4 MAN 12,3 a

1. Edition

En

Testoll-ISO 4113

PE 6 P 120 A 821 LS 409 RSV 500-750 P0/483

supersedes

company MAN

engine D 3256 BTXUE

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

 Port closing at prestroke $2,8 - 2,9$ mm (from BDC)
 $(2,75 - 2,95)$

Rotational speed rev/min	Control rod travel mm	Fuel delivery cm ³ /100 strokes	Difference cm ³ /100 strokes	Control rod travel mm	Fuel delivery cm ³ /100 strokes	Spring pre-tensioning (torque-control valve) mm
1	2	3	4	2	3	6
700	9,2-9,3	13,2 - 13,6	0,5(0,9)			
500	4,4-4,6	1,7 - 2,3	0,8(1,2)			

Adjust the fuel delivery from each outlet according to the values in

B. Governor Settings

Upper rated speed			Intermediate rated speed			④ Lower rated speed			③ Torque control	
Degree of deflection of control lever	rev/min	Control rod travel mm	Degree of deflection of control lever	rev/min	Control rod travel mm	Degree of deflection of control lever	rev/min	Control rod travel mm	rev/min	Control rod travel mm
1	2	3	4	5	6	7	8	9	10	11
loose	800	0,3 - 1,0	-	-	-	ca. 21	500	4,5		
	x = 1,25						500	4,4-4,6		
ca. 29	8,2	750 - 755					520-550	= 2,0		
⑤	4,0	780 - 790								
	950	0,3 - 1,0								

The numbers denote the sequence of the tests

C. Settings for Fuel Injection Pump with Fitted Governor

② Full-load stop		⑥ Rotational-speed limit		③a Fuel delivery characteristics		Starting fuel delivery Idle		⑤a Idle stop	
Test oil temp 40°C (104°F)		Note: changed to ... rev/min							
rev/min	cm ³ /1000 strokes	3		rev/min	cm ³ /1000 strokes	rev/min	cm ³ /1000 strokes	rev/min	Control rod travel mm
1	2			4	5	6	7	8	9
700	132,0-136,0 (129,0-139,0)	750-755 *	-	-	-	100	19,5 - 21,0 mm RW	-	-

Checking values in brackets

* 1 mm less control rod travel than col. 2

5.82

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BOSCH

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Test Specifications Fuel Injection Pumps ① and Governors

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WPP 001/4 MB 19,1 c

1. Edition

En

PE 12 P 100 A 320 LS 820 RQV 350-1100 PA370R

supersedes

company

Daimler-Benz

engine

OM 404

(370 PS)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

 Port closing at prestroke $\frac{3,40-3,50}{(3,35-3,55)}$ mm (from BDC)

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Difference cm ³ /100 strokes 4	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1080	11,5	10,4-10,6	0,3(0,6)			
	(+0,1)					
350	7,5-8,0	1,8- 2,3	0,4(0,7)			

Adjust the fuel delivery from each outlet according to the values in

B. Governor Settings

Upper rated speed			Intermediate rated speed			Lower rated speed			Sliding sleeve travel	
Degree of deflection of control lever 1	rev/min Control rod travel mm 2	Control rod travel mm rev/min 3	Degree of deflection of control lever 4	rev/min 5	Control rod travel mm 6	Degree of deflection of control lever 7	rev/min 8	Control rod travel mm 9	rev/min 10	mm 11
ca. 68	1080 1350	15,2-17,8 0 - 1	-	-	-	ca. 17	100 350	mind. 8 6,4-6,6	300 800	0,4-1,4 4,8-5,4
ca. 65	10,5 4,5	1120-1130 1205-1235					520-580 = 2,0 700 0 - 1		1120	8,3
						③a			-	-

Torque control travel a = mm

C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp. 40°C (104°F) ②		Rotational-speed limitation intermediate speed ②b ④a	Fuel delivery characteristics high idle speed ⑤b		Starting fuel delivery idle switching point ⑥	Torque-control travel ⑤ Control rod travel mm		
rev/min 1	cm³/1000 strokes 2	rev/min 3	rev/min 4	cm³/1000 strokes 5	rev/min 6	cm³/1000 strokes 7	rev/min 8	Control rod travel mm 9
1080	104,0-107,0 (102,0-109,0)	1120-1130*			100	110 - 130		
					350	19 - 24		
			1220	4,5 mm RW dispersion max. 6	100-190 (90-200)			

Checking values in brackets

* 1 mm less control rod travel than col. 2

8.77

Testoil-ISO 4113

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Test Specifications Fuel Injection Pumps ① and Governors

En

PE 6 P 110 A 720 RS 3003 RQV 250-1100 PA 183 R

supersedes

company

Scania

engine

D 11

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port closing at prestroke $3,0 + 0,1$ mm (from BDC) $(+ 0,15)$
 $(- 0,05)$

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Difference cm ³ / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1000	12	11,3 - 12,1	0,5			2,5±0,1**
600	9	4,7 - 5,9				(max. 2,2-2,9)
	12	11,3 - 12,8				
	15	16,7 - 18,4				
200	9	3,5 - 4,5				

Adjust the fuel delivery from each outlet according to the values in

** In the case of greater dispersion alter the delivery-valve spring pre-tension accordingly

B. Governor Settings

RQV .. 183

Upper rated speed			Intermediate rated speed			Lower rated speed			Sliding sleeve travel	
Degree of deflection of control lever 1	rev/min Control rod travel mm 2	Control rod travel mm/min 3	Degree of deflection of control lever 4	rev/min 5	Control rod travel mm 6	Degree of deflection of control lever 7	rev/min 8	Control rod travel mm 9	rev/min 10	mm 11
ca. 66	1120	15,0-17,6	-	-	-	ca. 10	150	6,5-8,0	1120	8,3
	1200	9,2-13,6					250	3,6-6,1		
	1300	1,0- 7,6					400	1,1-2,4		
	1410	0					500	0		
						3a				

Torque control travel a = mm

C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp. 40°C (104°F) (2)		Rotational-speed limitation intermediate speed (2b)	Fuel delivery characteristics high idle speed (5a)		Starting fuel delivery Idle switching point (6)	Torque-control travel (5)		
rev/min	cm³/1000 strokes	rev/min (4a)	rev/min	cm³/1000 strokes	rev/min	cm³/1000 strokes	rev/min	Control rod travel mm
1	2	3	4	5	6	7	8	9
1100	141,0-143,0	1135-1145*	600	143,0-147,0	100	240,0-290,0		
			1200	43,0- 53,0	225	12,0- 16,0		
			dispersion max. 4		dispersion max.2		**	
(increase by ± 2,0 cm³!)								

Checking values in brackets

* 1 mm less control rod travel than col. 2

Testoil-ISO 4113

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Test Specifications Fuel Injection Pumps ① and Governors

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 VDT-WPP 001/4 SCA 11,0 o
 1. Edition

En

PE 6 P 110 A 720 RS 3004 RQV 250-1100 PA 184 R

Adjustment test - pressure drop - n = 500 r/min:

Setting 332-348 mm Hg

0.45-0.47 bar = 0.1 mm control-rod travel decrease

Measurement 150-190 mm Hg

0.21-0.26 bar = 2.0 mm control-rod travel decrease

supersedes

company

engine

Scania

DS 11 LB 80

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

 $+ 0,15$
 $(- 0,05)$

Port closing at prestroke 3,0 + 0,1 mm (from BDC)

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Difference cm ³ /100 strokes 4	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1000	12	13,4 - 14,0	0,6			2,5 ± 0,1* (max. 2,2-2,9)
600	9	5,2 - 6,6				
	12	12,1 - 13,8				
	15	16,9 - 18,8				
200	9	3,5 - 4,7				

Adjust the fuel delivery from each outlet according to the values in

Testoil-ISO 4113

B. Governor Settings

RQV .. 184 R

Upper rated speed			Intermediate rated speed			Lower rated speed			Sliding sleeve travel	
Degree of deflection of control lever	rev/min Control rod travel mm	Control rod travel mm rev/min	Degree of deflection of control lever	rev/min	Control rod travel mm	Degree of deflection of control lever	rev/min	Control rod travel mm	rev/min	mm
1	2	3	4	5	6	7	8	9	10	11
ca. 66	1150	16,0-19,0	-	-	-	ca. 10	100	6,3-7,9	1170	8,3
	1440	0					250	4,8-6,4		
ca. 62	1100	15,0-17,4					400	2,5-3,8		
	1200	8,4-12,3					550	1,0-2,4		
	1300	1,0- 6,4					680	0		
	1400	0				3a				

Torque control travel a = mm

C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp. 40°C (104°F)		Rotational-speed limitation intermediate speed	Fuel delivery characteristics high idle speed		Starting fuel delivery idle switching point		Torque-control travel	
rev/min	cm ³ /1000 strokes	rev/min	rev/min	cm ³ /1000 strokes	rev/min	cm ³ /1000 strokes	rev/min	Control rod travel mm
1	2	3	4	5	6	7	8	9
1100	0,6 bar 182,0-184,0	1120	600	0,6 bar 183,0-187,0 0 bar	100	155,0-175,0		
(increase by ± 2,0 cm ³ !)			500	128,0-132,0	225	11,0- 13,0 dispersion max. 2)*		
					1200	34,0- 38,0 dispersion max. 4		

Checking values in brackets

* 1 mm less control rod travel than col. 2

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Test Specifications Fuel Injection Pumps ① and Governors

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WPP 001/4

4. Edition

En

PES 8 P 120 A 321 RS 242

RQV 250·1150 PA 208 DR

supersedes

2.74

company

Berliet

engine

V 835

Values apply to fuel-injection test tubing
8 x 2 x 1000

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port closing at prestroke 2,4+0,1 mm (from BDC) Cyl. 5

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Difference cm ³ /100 strokes 4	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1000	12	15,4 - 16,2	0,7			
600	9	5,2 - 6,2				
	12	9,5 - 11,0				
	15	16,0 - 17,7				
200	9	4,5 - 5,5				

Adjust the fuel delivery from each outlet according to the values in

B. Governor Settings

Upper rated speed			Intermediate rated speed			Lower rated speed			Sliding sleeve travel	
Degree of deflection of control lever	rev/min Control rod travel mm	Control rod travel mm rev/min	Degree of deflection of control lever	rev/min	Control rod travel mm	Degree of deflection of control lever	rev/min	Control rod travel mm	rev/min	mm
1	2	3	4	5	6	7	8	9	10	11
ca. 68	1170 1220 1300 1420	15,0-18,2 10,2-14,5 1,8-11,0 0	-	-	-	ca. 12	100 250 420 600 710	6,1-8,0 4,9-6,7 2,0-3,9 0,3-1,8 0	1190 1150 500	8,3 0 1,1-1,3
						③a				

Torque control travel a = 1,2 mm

C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp. 40°C (104°F)		Rotational-speed limitation intermediate speed	Fuel delivery characteristics		Starting fuel delivery idle switching point		Torque-control travel	
rev/min	cm ³ /1000 strokes	rev/min	rev/min	cm ³ /1000 strokes	rev/min	cm ³ /1000 strokes	rev/min	Control rod travel mm
1	2	3	4	5	6	7	8	9
1150	144,0-146,0	1260; 1290-1300*	1000 750 500	139,0-142,0 124,0-128,0 91,0- 97,0	100 250	mind. 90,0 13,0- 21,0		
					Charge-over point 200 - 130 min ⁻¹			

Checking values in brackets

* 1 mm less control rod travel than col. 2

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Test Specifications Fuel Injection Pumps ① and Governors

PE 6 P 120 A 420 LS 245 RQV 300-1050 PA 239 KR
Values apply to fuel-injection test tubing
8 x 2 x 1000

supersedes

company

engine

Allis Chalmers
Mark II

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port closing at prestroke 2,8 + 0,1 mm (from BDC)

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Difference cm ³ / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1000	12	26,4-27,1	1,0	Manifold-pressure compensator adjustment n = 500 r/min pressure drop in bar: 0.98 - start = full-load control-rod travel minus 0.1-0.3 mm 0.31 - end = full-load control-rod travel minus 3.2-3.4 mm		
600	6	8,6- 9,8				
	12	26,3-28,1				
	15	33,8-36,2				
200	6	4,2- 5,2				

Adjust the fuel delivery from each outlet according to the values in

Gap* in manifold-pressure
compensator = 9.0-9.5 mm!

B. Governor Settings

Upper rated speed			Intermediate rated speed			Lower rated speed			Sliding sleeve travel	
Degree of deflection of control lever 1	rev/min Control rod travel mm 2	Control rod travel mm rev/min 3	Degree of deflection of control lever 4	rev/min 5	Control rod travel mm 6	Degree of deflection of control lever 7	rev/min 8	Control rod travel mm 9	rev/min 10	mm 11
ca. 66	1050	15,0-18,0	-	-	-	ca. 10	250	6,4-8,0		
	1100	10,7-15,0					350	3,0-5,2		
	1150	6,0-11,6					450	1,3-2,8		
	1210	0 - 7					550	0		
	1300	0								

Torque control travel a = mm

C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp. 40°C (104°F) ②		Rotational-speed limitation intermediate speed ②b	Fuel delivery characteristics ⑤a		Starting fuel delivery idle switching point ⑥		Torque-control ⑤	
rev/min 1	cm ³ /1000 strokes 2	rev/min 3	rev/min 4	cm ³ /1000 strokes 5	rev/min 6	cm ³ /1000 strokes 7	rev/min 8	Control rod travel mm 9
1050	1,3 bar 256,0-258,0	1080-1090*	900 700	1,3 bar 251,0-257,0 238,0-244,0 0 bar 173,0-177,0	100 300	270,0-310,0 19,0- 25,0		
(increase by ± 1,0 cm ³ !)			500		Change-over point 250-150 U/min			

Checking values in brackets

* 1 mm less control rod travel than col. 2

Testoil-ISO 4113

Test Specifications Fuel Injection Pumps ② and Governors

PE 6 P 120 A 720 LS 3806 RQ 250/1200 PA 356 R

supersedes

company

engine

FIAT

8260.02.405

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

 Port closing at prestroke $\frac{3.50-3.60}{(3.45-3.65)}$ mm (from BDC)

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Difference cm ³ /100 strokes 4	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1200	9,3-9,4	17,3-17,7	0,5(0,9)			
250		2,8- 3,6	0,8(1,2)			

Adjust the fuel delivery from each outlet according to the values in .

B. Governor Settings

Checking of slider PRG check rev/min 1		Full-load speed regulation Setting point rev/min 3		Test specifications Control rod travel mm 5		Idle speed regulation Setting point rev/min 7		Test specifications Control rod travel mm 10		Torque control rev/min 11	
	Control rod travel mm 2		Control rod travel mm 4		rev/min 6		Control rod travel mm 8		Control rod travel mm 10		Control rod travel mm 12
650	15,6-16,4	650	16,0	8,3	1245-1260	250	6,8	100	min.8,6		
1400	0 - 1,0			4,0	1285-1315			250	6,7-6,9		
								390-430=	2,0		

Torque-control travel
on flyweight assembly dimension a =

mm

Speed regulation: At

1 mm less control
rod travel

C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery on governor control lever Test oil temp. 40°C (104°F) rev/min 1		Control rod stop rev/min 3		Fuel delivery characteristics rev/min 4		Starting fuel delivery Idle speed rev/min 6	
	cm ³ /1000 strokes 2		Control rod travel mm 3a		cm ³ /1000 strokes 5		Control rod travel mm 6b
1200	173,0 - 177,0 (170,0 - 180,0)					100	14,0 - 15,0

Checking values in brackets

10.79

Testoil-ISO 4113

Test Specifications

Distributor-type

Fuel-injection Pumps

VE 4/9 F 2400 R 66-10 Overflow temperature 45° C
0 460 494 080

supersedes
company
engine

VWV
1,6

All test specifications are valid only for Bosch Fuel-injection Pump Test Benches and Testers

Test Instructions and Test Equipment

Pre-stroke setting

mm

see VDT-W-460/

1. Settings	Rot speed rev/min	Settings	Charge-air press. bar (kgf/cm ²)	Difference in delivery cm ³
1.1 Timing device travel	1500	3,1-3,5 mm		
1.2 Supply-pump pressure	1500	4,9-5,5 bar (kgf/cm ²)		
1.3 Full-load delivery with charge-air pressure	1500	33,0-34,0 cm ³ /1000 strokes		2,5(0,3)
Full-load delivery without charge-air pressure	-	-- cm ³ /1000 strokes		
1.4 Idle regulation	415	6,0-10,0 cm ³ /1000 strokes		2,5(0,3)
1.5 Full-speed regulation	100	min. 38,0 cm ³ /1000 strokes		
1.6 Start	2600	11,0-17,0 cm ³ /1000 strokes		
1.7 Load-dependent port-closing	-	-		

2. Test Specifications

checking values in brackets ()

2.1 Timing device	n = rev/min mm	1000 1,4-2,2(1,1-2,5)	1500 (2,6-4,0)	2400 6,1-6,9(5,8-7,2)
2.2 Supply pump	n = rev/min bar (kgf/cm ²)	400 2,1-2,7		2400 6,9-7,5
Overflow delivery	n = rev/min cm ³ /10 s	500 55-111(40-126)		2400 55-111(40-126)

2.3 Fuel deliveries

Speed control lever	Rot. speed rev/min	Fuel delivery cm ³ /1000 strokes	Charge-air press. bar (kgf/cm ²)
End stop	2700 2600 2400 1500 600	2,0-10,0 (2,0-10,0) (10,0-18,0) 27,7-30,3 (26,7-31,3) (31,2-35,8) 21,5-24,5 (20,0-26,0)	
switch-off	2400	0	
Idle stop	1200 600 415	max. 3,0 max. 6,0 (4,0-12,0)	
End stop	400 500	min.17,0 max.23,0	
2.4 Solenoid	cut-in voltage	min.10V rated voltage 12V	

3. Dimensions

for assembly
and adjustment
mm

Designation	
K	3,2-3,4
KF	5,7-5,9
MS	1,3-1,5
SVS	max.2,5
FH*)	1,8-2,4
X K	18,4-20,4
X L	9,1-12,9

Observations

*) operating stroke
(cold-start accel.)

Testoil-ISO 4113

Test Specifications Fuel Injection Pumps ② and Governors

WPP 001/4 MB 19,1 L 1

1. Edition

En

PE 12 P 100 A 320 LS 828 RQ 1050 PA 310 R

 12- 1 - 5 - 9 - 8 - 3 - 4 - 11 - 10- 2 - 6 - 7
 0-45 -60 -105-120-165-180-225-240-285-300-345° ± 0,5°

(± 0,75°)

supersedes

company

engine

Daimler-Benz

OM 404

276 kW (375 PS)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

 Port closing at prestroke $\frac{3,20-3,30}{(3,15-3,35)}$ mm (from BDC) Cyl. 12

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Difference cm ³ /100 strokes 4	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1000	12,4+0,1	10,8-11,0	0,3(0,6)			
250	7,9-8,1	1,2- 1,8	0,3(0,5)			

Adjust the fuel delivery from each outlet according to the values in

Testoil-ISO 4113

B. Governor Settings

Checking of slider PRG check rev/min 1		Control rod travel mm 2		Full-load speed regulation Setting point rev/min 3		Control rod travel mm 4		Test specifications rev/min 6		Idle speed regulation Setting point rev/min 7		Control rod travel mm 8		Test specifications rev/min 9		Control rod travel mm 10		Torque control rev/min 11		Control rod travel mm 12	
-	-	-	-	-	-	-	-	11,4 4,9	1055-1060 1095-1105	-	-	-	-	-	-	-	-	-	-	-	-

Torque-control travel
on flyweight assembly dimension a =

mm

Speed regulation: At

1055-1060 min⁻¹1 mm less control
rod travel

C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery on governor control lever Test oil temp. 40°C (104°F) <div>②</div>		Control rod stop <div>③a</div>	Fuel delivery characteristics <div>③b</div>		Starting fuel delivery Idle speed <div>⑥</div>	
rev/min 1	cm³/-1000 strokes 2	rev/min 3	rev/min 4	cm³/-1000 strokes 5	rev/min 6	Control rod travel cm³/1000 strokes/mm 7
100	108,0-110,0 (106,0-112,0)	-	-	-	100	19,5-21 mm RW High idle speed
					1100	4,0(6,0) cm³/1000 dispersion

Checking values in brackets

4.81

①

Test Specifications Fuel Injection Pumps ① and Governors

40

WPP 001/4 VOL 7,0k 3

1. Edition

En

PE 6 P 110 A 320 RS 423

RQV 250-1250 PA 563

supersedes

company

engine

Volvo

TD 70 G

125 kW (170 PS)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port closing at prestroke $3,0-3,1$ mm (from BDC)
(2,95-3,15)

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Difference cm ³ /100 strokes 4	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
700	9,0-9,1	7,2-7,4	0,4(0,8)			2,5 ± 0,1
250	4,5-4,7	0,9-1,3				(2,2 - 2,9)

Adjust the fuel delivery from each outlet according to the values in

Testoil-ISO 4113

B. Governor Settings

Upper rated speed			Intermediate rated speed			Lower rated speed			Sliding sleeve travel	
Degree of deflection of control lever 1	rev/min Control rod travel mm 2	Control rod travel mm rev/min 3	Degree of deflection of control lever 4	rev/min 5	Control rod travel mm 6	Degree of deflection of control lever 7	rev/min 8	Control rod travel mm 9	rev/min 10	mm 11
max.	1250	15,2-17,8	-	-	-	ca. 11	100	min. 6,0	200	1,1-1,4
ca. 64	8,0 4,0 1450	1290-1300 1360-1390 0- 1,0					250	4,5-4,7	550	3,5-3,7
							380-440 = 2,0		900	5,2-5,3
									1250	7,9

Torque control travel a = mm

C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp. 40°C (104°F) ②		Rotational-speed limitation intermediate speed ④a	Fuel delivery characteristics high idle speed ⑤b		Starting fuel delivery Idle switching point ⑥		Torque-control travel ⑤	
rev/min 1	cm³/1000 strokes 2	rev/min 3	rev/min 4	cm³/1000 strokes 5	rev/min 6	cm³/1000 strokes 7	rev/min 8	Control rod travel mm 9
700	72,0-74,0 (69,0-77,0)	1290-1300*	-	-	100	140,0-170,0 / 20,0-21,0 mm RW	-	-

Checking values in brackets

* 1 mm less control rod travel than col. 2

A22

A22

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5.82

Test Specifications Fuel Injection Pumps ② and Governors

PE 6 P 120 A 721 RS 287

RQ 250/1075 PA 388 DR

supersedes -

company

F B W

engine

EU3A/E3a

(191 kW - 260 PS)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port closing at pre-torque 2,80-2,90 mm (from BDC)
(2,75-2,95)

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Difference cm ³ / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1050	10,3	19,2-19,6	0,5(0,8)			
	+0,1					
250	7,4-7,6	4,5 - 5,1	0,4(0,7)			

Adjust the fuel delivery from each outlet according to the values in

Testoil-ISO 4113

B. Governor Settings

Checking of slider PRG check		Full-load speed regulation				Idle speed regulation				Torque control	
rev/min 1	Control rod travel mm 2	Setting point rev/min 3	Control rod travel mm 4	Test specifications rev/min 5	Control rod travel mm 6	Setting point rev/min 7	Control rod travel mm 8	Test specifications rev/min 9	Control rod travel mm 10	rev/min 11	Control rod travel mm 12
600	15,6-16,4	600	16,0	9,3	1120-1135	250	7,5	100	min.9,0	1050	10,3-10,4
1250	0 - 1,0			4,0	1175-1206			250 400-	7,4-7,6 440=2,0	900 750 600	10,6-10,9 11,0-11,2 11,1-11,2

Torque-control travel on flyweight assembly dimension a 0,65 mm Speed regulation AI 1120-1135 min⁻¹ 1 mm less control rod travel

C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery on governor control lever Test oil temp. 40°C (104°F)		Control rod stop	Fuel delivery characteristics		Starting fuel delivery idle speed	
rev/min 1	cm ³ /1000 strokes 2	rev/min 3	rev/min 4	cm ³ /1000 strokes 5	rev/min 6	cm ³ /1000 strokes / mm 7
LDA 1050	0,7 bar 192,0-196,0 (189,0-199,0)	600	LDA 600	0,7 bar 163,0-169,0 (160,0-170,0)	100	150-170
			LDA 600	0 bar 120,0-124,0 (117,0-127,0)		

Checking values in brackets

D. Adjustment Test for Manifold Pressure Compensator

-2-

Test at n = 600 rev/min decreasing pressure - in bar gauge pressure

FBW 11,9 c

Pump/governor	Setting Gauge pressure = bar	Measurement Gauge pressure = bar	Control rod travel - diminution difference mm (1)
287 with 388 DR	0,7	0,36 0,26 0	11,1 - 11,2 10,7 - 10,8 9,8 - 10,0 9,4 - 9,5

Notes

(1) when n =

rev/min and
gauge pressure =

bar (= maximum full-load control rod travel)

②

Test Specifications Fuel Injection Pumps ② and Governors

40

WPP 001/4 MB 9,6i
3. Edition

En

PE 6 P 100 A 320 LS 841

RQ 300/1150 PA 187R (1)
RQV300/1150 PA 227R (2)

supersedes

6.79

company

Daimler Benz

engine

OM 401

150 kW (204 PS)

6 - 3 - 5 - 2 - 4 - 1

0 -45 -120-165-240-285

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port closing at prestroke $\overset{(3,15-3,35)}{3,20-3,30}$ mm (from BDC) RW 10,5 Cyl. 6

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Difference cm ³ /100 strokes 4	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1150	11,8±0,1	11,5-11,7	0,3(0,6)	12,5±0,1	11,6-11,8	
300	7,6-7,8	1,2-1,8	0,3(0,5)	8,2-8,4	1,2-1,8	

Adjust the fuel delivery from each outlet according to the values in

RQ - 187 R

B. Governor Settings

Checking of slider PRG check		Full-load speed regulation				Idle speed regulation				Torque control	
①		Setting point		Test specifications		Setting point		Test specifications		③	
rev/min 1	Control rod travel mm 2	rev/min 3	Control rod travel mm 4	Control rod travel mm 5	rev/min 6	rev/min 7	Control rod travel mm 8	rev/min 9	Control rod travel mm 10	rev/min 11	Control rod travel mm 12
600	13,8-14,6	600	14,2	10,8	1195-1210	300	7,7	100	min.9,2	1150	11,8-11,9
				4,0	1235-1265			300	7,6-7,8	600	11,8-12,0
1400	0 - 1							415-	455 = 2,0		

Torque-control travel
on flyweight assembly dimension a =

mm

Speed regulation: At

1 mm less control
rod travel

C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery on governor control lever Test oil temp. 40°C (104°F)		Control rod stop		Fuel delivery characteristics		Starting fuel delivery Idle speed	
②		③a		③b		⑥	
rev/min 1	cm ³ /1000 strokes 2	rev/min 3		rev/min 4	cm ³ /1000 strokes 5	rev/min 6	cm ³ /1000 strokes / mm 7
1150	115,0-117,0 (113,0-119,0)	500				100	110 - 130

Checking values in brackets

10.80

Testoil-ISO 4113

B3

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B. Governor Settings

RQV...227

MB 9,6 i
(2)

Upper rated speed			Intermediate rated speed			Lower rated speed			Sliding sleeve travel	
Degree of deflection of control lever	rev/min Control rod travel mm	Control rod travel mm rev/min	Degree of deflection of control lever	rev/min	Control rod travel mm	Degree of deflection of control lever	rev/min	Control rod travel mm	rev/min	mm
1	2	3	4	5	6	7	8	9	10	11
ca. 68	1150 1400	15,2-17,8 0 - 1	-	-	-	ca. 18	100 300 740-800	min. 9,8 8,2-8,4 =2,0	300 800 1200	0,4-1,5 4,4-4,8 8,3
ca. 64	11,5 4,0	1190-1200 1265-1295				(3a)				

Torque control travel a = mm

C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp 40°C (104°F)		Rotational-speed limitation intermediate speed	Fuel delivery characteristics high idle speed		Starting fuel delivery idle switching point		Torque-control travel	
rev/min	cm ³ /1000 strokes	rev/min	rev/min	cm ³ /1000 strokes	rev/min	cm ³ /1000 strokes	rev/min	Control rod travel mm
1	2	3	4	5	6	7	8	9
1150	115,0-117,0 (113,0-119,0)	1190-1200+			100	110 - 130		
					100-220	(80-240)		

Checking values in brackets

* 1 mm less control rod travel than col. 2

D. Adjustment Test for Manifold Pressure CompensatorTest at n = rev/min decreasing pressure - in bar gauge pressure
increasing

Pump/governor	Setting	Measurement	Control rod travel-diminution difference
	Gauge pressure = bar	Gauge pressure = bar	mm

En

10.80

Test Specifications Distributor-Type Fuel Injection Pump

46

WPP 001/4 IHC 2,9 c 3

1. Edition

En

VA 3/100 H 1100 CR 62

0 460 303 144

supersedes

company IHC

engine D 179-WW 406 D

Setting of the pointer at a stroke of 1 mm in relation to outlet "A".

Pre-stroke setting 0,3 mm \pm 0,04

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

Test Instructions and Test Equipment VDT-WPP 161/4 B

Pre-setting see reverse side

1. Settings	rev/min	Settings	Charge-air press kp/cm ²	Difference in delivery cm ³
1.1 Timing device travel	600	2,9-3,9 mm		
1.2 Supply pump pressure	600	4,0-4,4 kp/cm ²		
1.3 Full-load delivery without charge-air pressure	800	66,0-67,0 cm ³ /1000 strokes		2,5
Full-load delivery with charge-air pressure	--	-- cm ³ /1000 strokes		
1.4 Idle speed regulation	375	12,0-18,0 cm ³ /1000 strokes		3,0
1.5 Start 196 bar	100	mind.90,0 cm ³ /1000 strokes		
1.6 Full-load speed regulation	1200	21,0-29,0 cm ³ /1000 strokes		

Testoil-ISO 4113

2. Test Specifications

Checking values in brackets

2.1 Timing device	rev/min	170-320(140-350)	400	600	850-1000
	mm	Start	1,2-2,2(0,9-2,5)	(2,6-4,2)	5,2-5,9(4,9-6,2)
2.2 Supply pump	rev/min	200		600	1100
	kp/cm ²	1,6-2,1(1,4-2,3)		(3,8-4,6)	6,1-6,6(5,9-6,8)
Overflow delivery	rev/min	500			1100
	cm ³ /10 s	55-100(40-110)			55-100(40-110)

2.3 Fuel deliveries

Speed control lever	Delivery lever	rev/min	cm ³ /1000 strokes	Charge-air pressure kp/cm ²
End stop	Full	1230-1280 (1210-1300)	0	
		1200	(20,0-30,0)	
		1130-1150	Start	
		1080	69,0-72,0	(68,0-73,0)
		800		(65,5-67,5)
		500	64,5-67,5	(63,5-68,5)
	Stop	1100	0	
Idle stop	Full	440-530 (420-550)	0	
		375	(11,0-19,0)	
	Start	100	mind.90,0	
End stop		220-300		

B7

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37

Angle to the stop-plate	Pre-setting dimensions
Pump α $25 \pm 4^\circ$ β $45 \pm 8^\circ$ γ $30 - 8^\circ$ δ $60 \pm 8^\circ$	Pump Dimension IV = 2,0 mm Dimension V = 24,6 mm

Testoil-ISO 4113

Test Specifications Fuel Injection Pumps ① and Governors

PE 6 P 120 A 720 RS 7001

RQV 250-1000 PA 472 R

supersedes

company: Scania

engine DS 11

Values only apply to test nozzle-and-holder assembly 1 688 901 019 and fuel-injection test tubing 1 680 750 067.

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port closing at prestroke $\begin{matrix} 4,0-4,1 \\ (3,95-4,15) \end{matrix}$ mm (from BDC)

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Difference cm ³ /100 strokes 4	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1000	12,3+0,1	20,7-21,1	0,5(0,9)			
225	4,2-4,4	1,6- 2,0	0,5(0,8)			

Adjust the fuel delivery from each outlet according to the values in

B. Governor Settings

Upper rated speed			Intermediate rated speed			Lower rated speed			Sliding sleeve travel ①	
Degree of deflection of control lever 1	rev/min Control rod travel mm 2	Control rod travel mm rev/min 3	Degree of deflection of control lever 4	rev/min 5	Control rod travel mm 6	Degree of deflection of control lever 7	rev/min 8	Control rod travel mm 9	rev/min 10	mm 11
max.	1000	15,2-17,8	-	-	-	ca. 10	100	min. 6,0	200	1,0-1,2
							225	4,2-4,4	470	3,4-3,8
							290-350 = 2,0		730	5,1-5,3
ca. 60	11,3 4,0 1300	1040-1050 1135-1165 0 - 1,0				③a			1000	7,7

Torque control travel a = mm

C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp. 40°C (104°F) ②		Rotational-speed limitation intermediate speed ④a	Fuel delivery characteristics ⑤a high idle speed ⑤b		Starting fuel delivery Idle switching point ⑥		Torque-control travel ⑤	
rev/min 1	cm ³ /1000 strokes 2	rev/min 3	rev/min 4	cm ³ /1000 strokes 5	rev/min 6	cm ³ /1000 strokes 7	rev/min 8	Control rod travel mm 9
LDA	0,7 bar 207,0-211,0 (204,0-214,0)	1040-1050*	LDA 600	0,7 bar 194,0-200,0 (191,0-203,0)	100	220,0-270,0 / 20,0-21,0 mm RW	-	-
			LDA 500	139,0-145,0 (136,0-148,0)				

Checking values in brackets

* 1 mm less control rod travel than col. 2

D. Adjustment Test for Manifold Pressure Compensator

SCA 11,0 u 5⁻²⁻

Test at n = 500 rev/min decreasing pressure - in bar gauge pressure
increasing

Pump/governor	Setting Gauge pressure = bar	Measurement Gauge pressure = bar	Control rod travel - diminution difference mm (1)
PE6P ..RS7001 with ..PA472 R	0,7	0 0,45 0,38	12,3 - 12,4 11,3 - 11,4 12,0 - 12,1 11,5 - 11,7

Notes:

(1) when n =

rev/min and
gauge pressure =

bar (= maximum full-load control rod travel)

①

Test Specifications Fuel Injection Pumps ① and Governors

40

WPP 001/4 SCA 14,2 a

5. Edition

En

PE 8 P 120 A 920/4 LS 7002 RQV 250-1000 PA 512

supersedes

5.82

company

Scania

engine

DS14

1 - 2 - 7 - 3 - 4 - 5 - 6 - 8 - je $45^\circ \pm 0,5$ ($\pm 0,75^\circ$)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

from FD 141: 5,0-5,1
Port closing at prestroke (4,95-5,15)to FD 052: 4,4 - 4,5
mm (from BDC) (4,35-4,55)

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Difference cm ³ /100 strokes 4	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
700	13,2+0,1	21,2 - 21,4	0,5(0,9)			3,3 \pm 0,1 (3,0 - 3,5)
225	4,7-4,9	1,4 - 1,7	0,5(0,8)			
1000	13,2+0,1	C, col. 4 u. 5				
500	11,3+0,1					

Adjust the fuel delivery from each outlet according to the values in .

B. Governor Settings

Upper rated speed			Intermediate rated speed			Lower rated speed			Sliding sleeve travel	
Degree of deflection of control lever 1	rev/min 2	Control rod travel mm 3	Degree of deflection of control lever 4	rev/min 5	Control rod travel mm 6	Degree of deflection of control lever 7	rev/min 8	Control rod travel mm 9	rev/min 10	mm 11
max.	1000	15,2-17,8	-	-	-	ca. 10	100	min. 6,4	200	1,0-1,2
ca. 60	12,2	1040-1050					225	4,7-4,9	470	3,3-3,8
	4,0	1140-1170							730	5,1-5,3
	1300	0 - 1,0							1000	7,7
						255-365 (3a)				

Torque control travel a = mm

C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp. 40°C (104°F) ②		Rotational speed limitation intermediate speed ④a	Fuel delivery characteristics ⑤a high idle speed ⑤b		Starting fuel delivery idle switching point ⑥		Torque-control travel ⑤	
rev/min 1	cm ³ /1000 strokes 2	rev/min 3	rev/min 4	cm ³ /1000 strokes 5	rev/min 6	cm ³ /1000 strokes 7	rev/min 8	Control rod travel mm 9
LDA 700	0,7 bar 212,0-214,0 (209,0-217,0)	1040-1050*	LDA 1000	0,7 bar 222,0-230,0	100	230,0-280,0	-	-
			LDA 500	0 bar 144,0-148,0 (141,0-151,0)	225	14,0- 17,0		

Checking values in brackets

* 1 mm less control rod travel than col. 2

Testoil-ISO 4113

B17

B17

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6.82

D. Adjustment Test for Manifold Pressure Compensator

-2-

Test at n = rev/min decreasing pressure - in bar gauge pressure

SCA 14,2 a

Pump/governor	Setting	Measurement	Control rod travel - diminution difference
	Gauge pressure = bar	Gauge pressure = bar	mm (1)
..LS 7002 RQV..PA 512	0,7	0 0,29 0,38	13,2 - 13,3 11,3 - 11,4 12,0 - 12,2 12,5 - 12,6

Notes:

(1) when n =

rev/min and
gauge pressure =

bar (= maximum full-load control rod travel)

Due to smoothing of the sealing edge, the initial spring tension with a new delivery-valve holder must be adjusted to 3,0 mm.

①

Test Specifications Fuel Injection Pumps ① and Governors

40

WPP 001/4 SCA 14,2 a 2

1. Edition

En

PE 8 P 120 A 920/4 LS 7002

RQV 200-950 PA 547

supersedes

company.

Scania

engine

DSC 1401

LKW T 142

1 - 2 - 7 - 3 - 4 - 5 - 6 - 8 je $45^\circ \pm 0,5$ ($\pm 0,75^\circ$)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

from FD 141: 5,0 - 5,1 to FD 052: 4,4 - 4,5 mm
 Port closing at prestroke (4,95-5,15) mm (from BDC) (4,35-4,55)

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Difference cm ³ /100 strokes 4	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
950	13,8±0,1	20,6-21,4	0,5(0,9)			3,3 ± 0,1 (3,0 - 3,5)
225	4,4-4,6	0,8- 1,2				

Adjust the fuel delivery from each outlet according to the values in .

Testoil-ISO 4113

B. Governor Settings

Upper rated speed			Intermediate rated speed			Lower rated speed			Sliding sleeve travel	
Degree of deflection of control lever 1	rev/min Control rod travel mm 2	Control rod travel mm rev/min 3	Degree of deflection of control lever 4	rev/min 5	Control rod travel mm 6	Degree of deflection of control lever 7	rev/min 8	Control rod travel mm 9	rev/min 10	mm 11
max.	1070	15,2-17,8	-	-	-	ca.9	100	min.6,0	150	0,5-0,8
ca.59	12,8	990-1000					225	4,4-4,6	420	2,9-3,4
	4,0	1115-1145					310-370	= 2,0	680	4,7-4,9
	1250	0 - 1,0							950	7,1

Torque control travel a = mm

C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp. 40°C (104°F) ②		Rotational-speed limitation intermediate speed ②b	Fuel delivery characteristics ⑤a		Starting fuel delivery idle switching point ⑥		Torque-control ⑤	
rev/min 1	cm ³ /1000 strokes 2	rev/min 3	rev/min 4	cm ³ /1000 strokes 5	rev/min 6	cm ³ /1000 strokes 7	rev/min 8	Control rod travel mm 9
LDA 950	0,7 bar 206,0-214,0 (204,0-216,0)	990-1000*	LDA 700	0,7 bar 202,0-204,0 (199,0-207,0)	100	230,0-280,0 / 20,0 - 21,0 mm RW	-	-
			LDA 500	0 bar 166,0-170,0 (163,0-173,0)				

Checking values in brackets

* 1 mm less control rod travel than col. 2

B21

6.82

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321

D. Adjustment Test for Manifold Pressure Compensator

-2-

Test at n = 500 rev/min decreasing pressure - in bar gauge pressure
increasing

SCA 14,2 a 2

Pump/governor	Setting	Measurement	Control rod travel - diminution difference
	Gauge pressure = bar	Gauge pressure = bar	mm (1)
PE8P..LS 7002 with..PA 547	0,38		13,4 - 13,5
		0,7	13,8 - 13,9
		0	12,2 - 12,3
		0,26	12,5 - 12,7

Notes:

(1) when n =

rev/min and
gauge pressure =

bar (= maximum full-load control rod travel)

①

Test Specifications Fuel Injection Pumps ① and Governors

40

WPP 001/4 SCA 11,0 u 6

1. Edition

En

PE 6 P 120 A 720 RS 7001

RQV 200-1000 PA 539

supersedes

company:

Scania

engine:

DS 11 (1)

DSC 1101 (2)

Values only apply to test nozzle-and-holder assembly 1 688 901 019 and fuel-injection test tubing 1 680 750 067.
All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

from FD 141: 5,0 - 5,1 mm (from BDC) to FD 052: 4,4 - 4,5 mm
(4,95 - 5,15) mm (from BDC) (4,35 - 4,55)

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Difference cm ³ /100 strokes 4	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
700	13,2±0,1	20,1 - 20,3	0,5(0,9)			3,3 ± 0,1
225	4,2-4,4	1,1 - 1,4	0,3(0,6)			(3,0 - 3,5)

Adjust the fuel delivery from each outlet according to the values in .

B. Governor Settings

(1)

Upper rated speed			Intermediate rated speed			Lower rated speed			Sliding sleeve travel	
Degree of deflection of control lever 1	rev/min Control rod travel mm 2	Control rod travel mm rev/min 3	Degree of deflection of control lever 4	rev/min 5	Control rod travel mm 6	Degree of deflection of control lever 7	rev/min 8	Control rod travel mm 9	rev/min 10	mm 11
max.	1000	15,2-17,8	-	-	-	ca. 10	100	min. 5,8	150	0,5-0,8
ca. 62	12,2 4,0 1300	1040-1050 1145-1175 0 - 1,0				255-365	225	4,2-4,4	430 720 1000	3,0-3,5 5,0-5,2 7,7

Torque control travel a = mm

C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp. 40°C (104°F) ②		Rotational-speed limitation intermediate speed ②b ④a	Fuel delivery characteristics ⑤a high idle speed ⑤b		Starting fuel delivery idle switching point ⑥		Torque-control ⑤ travel Control rod travel mm	
rev/min 1	cm³/1000 strokes 2	rev/min 3	rev/min 4	cm³/1000 strokes 5	rev/min 6	cm³/1000 strokes 7	rev/min 8	mm 9
LDA 700	0,7 bar 201,0-203,0 (198,0-206,0)	1040-1050*	LDA 1000 LDA 500	0,7 bar 201,0-209,0 (199,0-211,0) 0 bar 166,0-170,0 (163,0-173,0)	100	220,0-270,0 / 20,0- 21,0 mm RW	-	-

Checking values in brackets

* 1 mm less control rod travel than col. 2

Testoil-ISO 4113

B23

B23

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6.82

B. Governor Settings

Upper rated speed			Intermediate rated speed			Lower rated speed			Sliding sleeve travel	
Degree of deflection of control lever	rev/min Control rod travel mm	Control rod travel mm rev/min	Degree of deflection of control lever	rev/min	Control rod travel mm	Degree of deflection of control lever	rev/min	Control rod travel mm	rev/min	mm
1	2	3	4	5	6	7	8	9	10	11
max.	1070	15,2-17,8	-	-	-	ca.9	100	min.6,0	150	0,5-0,8
							225	4,3-4,5	430	3,0-3,5
ca.61	12,8 4,0 1300	1040-1050 1150-1180 0 - 1,0				3a	310-370 = 2,0		720	5,0-5,2
									1000	7,7

Torque control travel a = mm

C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp. 40°C (104°F)		Rotational-speed limitation intermediate speed	Fuel delivery characteristics high idle speed	Starting fuel delivery idle switching point	Torque-control travel
rev/min	cm ³ /1000 strokes	rev/min	rev/min	rev/min	rev/min
1	2	3	4	6	8
LDA	0,7 bar	1040-1050*	LDA	100	220,0-270,0
700	215,0-217,0 (212,0-220,0)		1000		/ 20,0 to 21,0 mm RW
			LDA		
			500		

Checking values in brackets

* 1 mm less control rod travel than col: 2

D. Adjustment Test for Manifold Pressure CompensatorTest at n = 500 rev/min decreasing pressure - in bar gauge pressure
increasing

Pump/governor	Setting	Measurement	Control rod travel- diminution difference
	Gauge pressure = bar	Gauge pressure = bar	mm
PE 6 P..RS 7001 with ..PA 539	(1). 0,44	0,7 0 0,28	12,8 - 12,9 13,2 - 13,3 11,6 - 11,7 12,0 - 12,2
	(2) 0,48	0,7 0 0,3	13,3 - 13,4 13,8 - 13,9 11,7 - 11,8 12,2 - 12,4

En

Test Specifications Fuel Injection Pumps ① and Governors

En

PE 6 P 110 A 320 RS 423

RQV 250-1150 PA 435

supersedes

company

Volvo

engine

TD 70 G

130 kW

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port closing at prestroke ^{3,0-3,1}
(2,95-3,15) mm (from BDC)

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Difference cm ³ / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
700	10,0+0,1	8,6-8,8	0,4(0,8)			2,5 ± 0,1
250	4,5-4,7	0,9-1,3	0,3(0,6)			(2,2 - 2,9)

Adjust the fuel delivery from each outlet according to the values in

B. Governor Settings

Upper rated speed			Intermediate rated speed			Lower rated speed			Sliding sleeve travel	
Degree of deflection of control lever 1	rev/min Control rod travel mm 2	Control rod travel mm rev/min 3	Degree of deflection of control lever 4	rev/min 5	Control rod travel mm 6	Degree of deflection of control lever 7	rev/min 8	Control rod travel mm 9	rev/min 10	mm 11
max.	1150	15,2-17,8	-	-	-	ca. 10	100 250	min. 6,0 4,5-4,7	200 520 830 1150	1,1-1,4 3,5-3,7 5,1-5,3 8,0
ca. 66	9,0 4,0 1350	1190-1200 1260-1290 0 - 1,0				3a	380-440	=2,0		

Torque control travel a = mm

C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp. 40°C (104°F) 2		Rotational-speed limitation intermediate speed 4a	Fuel delivery characteristics high idle speed 5b		Starting fuel delivery idle switching point 6		Torque-control travel 5	
rev/min 1	cm ³ /1000 strokes 2	rev/min 3	rev/min 4	cm ³ /1000 strokes 5	rev/min 6	cm ³ /1000 strokes 7	rev/min 8	Control rod travel mm 9
LDA 700	0,7 bar 86,0-88,0 (83,0-91,0)	1190-1200	LDA 700	0 bar 77,0-80,0 (74,0-83,0)	100 250	140,0-170,0 / 20,0- 21,0 mm RW 11,0-15,0	-	-

Checking values in brackets

* 1 mm less control rod travel than col. 2

5.82

Testoil-ISO 4113

D. Adjustment Test for Manifold Pressure Compensator

-2-

Test at n = 500 rev/min decreasing pressure - in bar gauge pressure
increasing

VOL 7,0 k 2

Pump/governor	Setting Gauge pressure = bar	Measurement Gauge pressure = bar	Control rod travel: diminution difference mm (1)
PE 6 P .. RS 423 with ..PA 435	0,7	0 0,36 0,33	10,0 - 10,1 9,5 - 9,6 9,8 - 9,9 9,6 - 9,7

Notes

(1) when n =

rev/min and
gauge pressure =

bar (= maximum full-load control rod travel)

C4

Testoil-ISO 4113

En

C4

Test Specifications Fuel Injection Pumps and Governors

WPP 001/4 VOL 6,0 f

7. Edition

En

PES 6 MW 100/320 RS 11 0 413 206 002

supersedes 6.81

RMW 300---1400 MW 18 0 420 093 010

company Volvo

engine D 60 A

1 - 5 - 3 - 6 - 2 - 4 = 0 - 60-120-180-240-300 $\pm 0,5$ (0,75°)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port closing at prestroke 2,40-2,50 mm (from BDC) 9 -12mm Control rod travel
(2,35-2,55)

Rotational speed rev/min	Control rod travel mm	Fuel delivery cm ³ /100 strokes	Difference cm ³ /100 strokes	Control rod travel mm	Fuel delivery cm ³ /100 strokes	Spring pre-tensioning (compensating valve) mm
1	2	3	4	2	3	6
1400	9,0-9,2	7,6 - 7,8	0,3(0,15)			
300	5,7-5,9	1,7 - 1,9	0,3(0,5)			
Sect. C, col. 4,5			0,3(0,5)			

See uniform delivery according to the values in

Checking values in brackets

B. Governor Settings

Lower rated speed			Upper rated speed			Variations in control rod travel		
Degree of deflection of control lever	Control rod travel mm	Rotational speed rev/min	Degree of deflection of control lever	Control rod travel mm	Rotational speed rev/min		Rotational speed rev/min	Control rod travel mm
1	2	3	4	5	6	7	8	9
20	① 8,5 ② 5,7-5,9 ③ ** ④ 0 - 1,0 ⑤	100 300 325 - 540	78±4 ⑦ ⑧ ⑨ 40+5 ⑩ ⑪	9,0-9,2 8,1 4,0 0,1-1,0	1400 1400-1450 1500-1520 1610 -		⑫ 100 ⑬ 1300 ⑭ 1200 1050 ⑥ Switching point 100-230(80-250)	20,5-21,5 9,0- 9,2 9,1- 9,3 9,7- 9,9

C. Settings for Fuel Injection Pump with Governor Mounted

Full-load delivery ①9		Full-load speed regulation ⑧a	Variations in fuel delivery ①7		Starting fuel delivery idle ①8		Difference
Test oil temp 40°C (104°F)							
rev/min	cm ³ /1000 strokes	rev/min	rev/min	cm ³ /1000 strokes	rev/min	cm ³ /1000 strokes	cm ³ /1000 strokes
1	2	3	4	5	6	7	8
1400	76,0-78,0 (75,0-79,0)	1440-1450* (1435-1455)	600	63,5-66,5 (62,5-67,5)	100 300	mind. 140 17,0-19,0 (16,0-20,0)	⑫a 3,0 (5,0) ⑮ ⑯

Checking values in brackets

less control rod travel than in Column 2

5.82

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Testoil-ISO 4113

1. Idle stage

4.0 + 0.25 mm

2. ** At this speed, set auxiliary idle spring such that contact is made.
There must be no influence on idle delivery.
3. Control-rod travel of approx. 1 mm must be obtained when stopped.
Check following adjustment of locking speed.

Test Specifications Fuel Injection Pumps and Governors

En

PES 4 MW 55/320 RS 14
RW 375/2200 MW 21

supersedes 2.79
company Daimler-Benz
engine OM 616-USA

1 - 3 - 4 - 2 = 0 - 90-180-270° ± 0,5° (0,75°)

Note: Before starting testing, observe the important instructions on the reverse. See point 3!

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers.

A. Fuel Injection Pump Settings

Port closing at prestroke 1,70 - 1,80 mm (from BDC) 21 mm Control rod travel
(1,65 - 1,85)

Rotational speed rev/min	Control rod travel mm	Fuel delivery cm ³ /100 strokes	Difference cm ³ /100 strokes	Control rod travel mm	Fuel delivery cm ³ /100 strokes	Spring pre-tensioning (compensating valve) mm
1	2	3	4	2	3	6
1000	13,1-13,2	3,75-3,85	0,25(0,3)			
375	6,6-6,8	0,65-0,75	0,10(0,15)			
1600/2180	Sect. C, col. 4,5		0,25(0,30)			

Set uniform delivery according to the values in

Checking values in brackets

B. Governor Settings

without altitude-pressure compensator

Lower rated speed			Upper rated speed			Variations in control rod travel		
Degree of deflection of control lever	Control rod travel mm	Rotational speed rev/min	Degree of deflection of control lever	Control rod travel mm	Rotational speed rev/min		Rotational speed rev/min	Control rod travel mm
1	2	3	4	5	6	7	8	9
30	① min. 11	100-300		⑦ 12,4-12,6	2180		⑫ 100	20,5-21,5
	② 6,6-6,8	375	67±2	⑧ 11,5	2280-2300		⑬ 1600	12,8-13,0
	③ **	385		⑨ 4,0	2670-2730		⑭ 1000	13,1-13,2
	④ -	-		⑩ 0 -1,0	2950		⑮ 2180	12,4-12,6
	⑤ max. 2	650-700		⑪	-		⑯ Switching point 270-320(250-340)	

without altitude-pressure compensator

C. Settings for Fuel Injection Pump with Governor Mounted

Full-load delivery ⑰		Full-load speed regulation ⑱a	Variations in fuel delivery ⑰		Starting fuel delivery Idle ⑰		Difference cm ³ /1000 strokes	
Test oil temp. 40°C (104°F)								
rev/min	cm ³ /1000 strokes	rev/min	rev/min	cm ³ /1000 strokes	rev/min	cm ³ /1000 strokes	cm ³ /1000 strokes	
1	2	3	4	5	6	7	8	
2180	39,0-42,0 (38,0-43,0)	2280-2300* (2275-2305)	1600	39,0-41,0 (38,0-42,0)	100	mind. 56,0	6,0	⑫a
			1000	37,5-38,5 (36,5-39,5)	375	6,5-7,5 (6,0-8,0)	1,0 (1,5)	⑬
					2550	14,5-20,5 (13,5-21,5)	2,5 (3,0)	⑭

Checking values in brackets

less control rod travel than in Column 2

Testoil-ISO 4113

1. Testing of sections A, B and C should be done without the ADA aneroid box. When this test has been completed the ADA aneroid box is connected.

Testing the governor with ADA-aneroid box (147)

Engine speed	Setting point	Control-rod travel reduction from full-load control-rod travel
1000 min ⁻¹	840 mbar (630 mm Hg)	0.9-1.1 (0.85-1.15) mm
	Checking point	
1000 min ⁻¹	913 mbar (685 mm Hg)	0.1 - 0.5 (0.05-0.55) mm

2. Pin projection = 16.65 ± 0.05 mm.

3. Adjusting the idle stage

Text replaces section 4.1 of the test instructions.

Set the control lever to 30°.

Operate the fuel-injection pump at $n = 800 \text{ min}^{-1}$.

Screw the spring retainer (torque-control capsule) or the driver with a pin wrench KDEP 1064/1 or a 1/2" hexagon-socket-screw-key so far that a control-rod travel of 1.2 - 1.5 mm is attained.

Further test steps see Test Instructions VDT-W-420/300 En.

4. ++ At this engine speed exceed the control-rod travel by $0.4 + 0.1$ mm. Idle delivery must not be affected.
5. Adjustment angle: Stop ... idle = 35°, idle ... full load = 39°.
6. Sensing lever adjustment: Set the sensing lever at $n = 375 \text{ min}^{-1}$ (control lever in full-load position). At this speed the control-rod travel must exceed the full-load control-rod travel at $n = 1000 \text{ min}^{-1}$ by 0.2 - 0.5 (0.1 - 0.6 mm) mm.
7. Check the pneumatic shut-off
Control lever in idle position. Operate the fuel-injection pump at $n = 375 \text{ min}^{-1}$.
At $p_u = 450 \text{ mbar}$ (338 mm Hg) (vacuum) the control-rod must quickly return to control-rod travel 0 mm.

Test Specifications Fuel Injection Pumps and Governors

WPP 001/4 MB 3,0 h
3. Edition

En

PES 5 MW 55 / 320 RS 12
RW 350/2200 MW 26

supersedes 11.77
company Daimler-Benz
engine OM 617

1 - 2 - 4 - 5 - 3 - = 0 - 72 - 144 - 216 - 288 ± 0,5° (0,75°)

See page 2

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port closing at prestroke 1,70-1,80 mm (from BDC) 21 mm Control rod travel
(1,65-1,85)

Rotational speed rev/min	Control rod travel mm	Fuel delivery cm ³ /100 strokes	Difference cm ³ /100 strokes	Control rod travel mm	Fuel delivery cm ³ /100 strokes	Spring pre-tensioning (compensating valve) mm
1	2	3	4	2	3	6
1000	13,5+0,1	3,75-3,85	0,25(0,3)			
350	6,4-6,6	0,65-0,75	0,10(0,15)			
1600/2180	Sect. C, col. 4,5		0,25(0,3)			

Set uniform delivery according to the values in

Checking values in brackets

B. Governor Settings

Lower rated speed			Upper rated speed			Variations in control rod travel		
Degree of deflection of control lever	Control rod travel mm	Rotational speed rev/min	Degree of deflection of control lever	Control rod travel mm	Rotational speed rev/min		Rotational speed rev/min	Control rod travel mm
1	2	3	4	5	6	7	8	9
30	① min. 11	100-250	68±4	⑦ 12,3-12,5	2180		⑫ 100	20,5-21,5
	② 6,4-6,6	350		⑧ 11,4	2280-2300		⑬ 1600	12,9-13,1
	③ **	360		⑨ 4,0	2670-2730		⑭ 1000	13,5-13,6
	④ -	-		⑩ 0-1,0	2950		2180	12,3-12,5
	⑤ max. 2	650-700		⑪ -	-		⑥ Switching point	
							270-320(250-340)	

C. Settings for Fuel Injection Pump with Governor Mounted

Full-load delivery ⑬		Full-load speed regulation ⑧a		Variations in fuel delivery ⑮		Starting fuel delivery idle		Difference
Test oil temp 40°C (104°F)								
rev/min	cm ³ /1000 strokes	rev/min		rev/min	cm ³ /1000 strokes	rev/min	cm ³ /1000 strokes	cm ³ /1000 strokes
1	2	3		4	5	6	7	8
2180	39,0-41,0 (38,0-42,0)	2280-2300* (2275-2305)		1600	39,0-41,0 (38,0-42,0)	100	mind. 56,0	6,0 ⑫a
				1000	37,5-38,5 (36,5-39,5)	350	6,5-7,5 (6,0-8,0)	1,0 (1,5)
						1550	14,5-20,5 (13,5-21,5)	2,5 (3,0) ⑮
								⑯

Checking values in brackets

less control rod travel than in Column 2

2.79

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Testoil-ISO 4113

Notes:

1. Guide-sleeve idle travel 6.75 ± 0.25 mm
2. ** At this speed, override control-rod travel by 0.4 ± 0.1 mm.
There must be no influence on idle delivery.
3. Sensing-lever setting: at $n = 1000 \text{ min}^{-1}$, max. 0.5 mm control-rod travel may be subtracted with the sensing lever.
(Adjustment aid for fuel-delivery characteristics)
4. Idle - full load = 34 - 42 degrees advance-angle range must be complied with.
5. Pneumatic shut-off device:

Control lever in idle position. Drive fuel-injection pump with $n = 350 \text{ min}^{-1}$. Control rod must rapidly assume 0 mm control-rod travel at $P = 450 \text{ mbar}$ (338 mmHg) (vacuum).

Test Specifications Fuel Injection Pumps and Governors

VDT-WPP 001/4 MB 3,0 e

4. Edition

En

PES 5 MW 55/320 RS 12

RW 250/2200 MW 20

supersedes 8.77

company Daimler-Benz

engine OM 617 (Sweden)

Cam sequence and angular spacing:

1-2-4-5-3--0-72-144-216-288° See page 2

Angular cam spacing tolerance $\pm 0,5$ (0,75°)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port closing at prestroke

1,7-1,8
(1,65-1,85)

mm (from BDC)

21,0mm Control rod travel

Rotational speed	Control rod travel	Fuel delivery	Difference	Control rod travel	Fuel delivery	Spring pre-tensioning (compensating valve)
rev/min	mm	cm ³ /100 strokes	cm ³ /100 strokes	mm	cm ³ /100 strokes	mm
1	2	3	4	2	3	6
1000	13,5	3,75-3,85	0,25(0,3)			
350	+ 0,1 6,5 ± 0,1	0,65-0,75	0,1(0,15)			
1600 2180)--	Sect. C, col. 4,5		0,25(0,3)			

Set uniform delivery according to the values in

Checking values in brackets

B. Governor Settings

Lower rated speed			Upper rated speed			Variations in control rod travel		
Degree of deflection of control lever	Control rod travel	Rotational speed	Degree of deflection of control lever	Control rod travel	Rotational speed		Rotational speed	Control rod travel
1	mm	rev/min	4	mm	rev/min	7	rev/min	mm
30	(1) min. 11	150-220	68±	(7) 12,4±0,1	2180	(12) 100	100	20,5-21,5
	(2) 6,4-6,6	350		(8) 11,4	2280-2300	(13) 1600	1600	12,9-13,1
	(3) **	360		(9) 4,0	2670-2730	(14) 1000	1000	13,5-13,6
	(4) - - -	- -		(10) max. 1	2850-2950	(15) 2180	2180	12,3-12,5
	(5) max. 2	650-700		(11)		(6) Switching point	270-320 (250-340)	

C. Settings for Fuel Injection Pump with Governor Mounted

Full-load delivery (19)		Full-load speed regulation (8a)	Variations in fuel delivery (17)		Starting fuel delivery (18)		
Test oil temp. 40°C (104°F)					Idle		Difference
rev/min	cm ³ /1000 strokes	rev/min	rev/min	cm ³ /1000 strokes	rev/min	cm ³ /1000 strokes	cm ³ /1000 strokes
1	2	3	4	5	6	7	8
1000	37,5-38,5 (36,5-39,5)	2280-2300* (2275-2305)	1600	39,0-41,0 (38,0-42,0)	100	min.56,0	6,0 (12a)
			2180	39,0-41,0 (38,0-42,0)	350	6,5-7,5 (6,0-8,0)	1,0 (15)
					2550	14,5-20,5 (13,5-21,5)	2,5 (18)
							3,0

Checking values in brackets

less control rod travel than in Column 2

2.79

Testoil-ISO 4113

Note:

1. Sleeve idle-speed travel = 6.75 ± 0.25 mm
2. Advance-angle range, idle speed to full-load = $34 \dots 42^\circ$
3. ** (3) At this rotational speed applying force, increase the control-rod travel by 0.4 ± 0.1 mm. In doing so, the idle delivery must not be affected!
4. With $n = 1000 \text{ min}^{-1}$ (speed-control lever in full-load position), the control-rod travel can be reduced by a max. of 0.5 mm using the sensing pin.
(Fuel delivery adjustment aid.)
5. Test the pneumatic cut-off:
Control lever in the idle position. Drive the injection pump at $n = 350 \text{ min}^{-1}$. At $p_u = 450 \text{ bar}$ (338mm Hg) (vacuum), the control rod must quickly return to the travel position 0 mm.

Test Specifications Fuel Injection Pumps and Governors

En

PES 4 MW 55/320 RS 17
RW 375/2250 MW 23 (MW 24)
1-3-4-2 = 0-90-180-270° ± 0,50° (0,75°)
See page 2

supersedes 10.77
company Daimler-Benz
engine OM 616

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port closing at prestroke 1,70-1,80
(1,65-1,85) mm (from BDC) 21 mm Control rod travel

Rotational speed rev/min	Control rod travel mm	Fuel delivery cm ³ /100 strokes	Difference cm ³ /100 strokes	Control rod travel mm	Fuel delivery cm ³ /100 strokes	Spring pre-tensioning (compensating valve) mm
1	2	3	4	2	3	6
1000	13,4±0,1	3,75-3,85	0,25(0,3)			
375	6,6±0,1	0,65-0,75	0,1 (0,15)			
1600/2200	-Sect. C, col. 4,5		0,25(0,3)			

Set uniform delivery according to the values in

Checking values in brackets

B. Governor Settings

Lower rated speed			Upper rated speed			Variations in control rod travel		
Degree of deflection of control lever	Control rod travel	Rotational speed	Degree of deflection of control lever	Control rod travel	Rotational speed		Rotational speed	Control rod travel
mm	rev/min		mm	rev/min		rev/min	mm	
1	2	3	4	5	6	7	8	9
①	min. 11	100-300	68±4	⑦ 12,7-12,9	2200	⑫	100	10,5-21,5
②	6,5-6,7	375	⑧	11,8	2330-2350	⑬	1600	12,9-13,1
③	**	385	⑨	4,0	2750-2840	⑭	1000	13,4-13,5
④	-	-	⑩	0-1,0	2950		2200	12,7-12,9
⑤	max. 2	650-700	⑪			⑥	Switching point 270-320(250-340)	

Testoil-ISO 4113

C. Settings for Fuel Injection Pump with Governor Mounted

Full-load delivery		Full-load speed regulation	Variations in fuel delivery		Starting fuel delivery		Difference
Test oil temp 40°C (104°F)					Idle		
rev/min	cm ³ /1000 strokes	rev/min	rev/min	cm ³ /1000 strokes	rev/min	cm ³ /1000 strokes	cm ³ /1000 strokes
1	2	3	4	5	6	7	8
2200	39,5-41,5 (38,5-42,5)	2330-2350* (2325-2355)	1600	39,5-41,5 (38,5-42,5)	100	mind. 53,0	6,0
			1000	37,5-38,5 (36,5-39,5)	375	6,5-7,5 (6,0-8,0)	1,0 (1,5)
					2600	14,5-20,5 (13,5-21,5)	2,5 (3,0)

Checking values in brackets

less control rod travel than in Column 2

Notes:

1. Idle guide-sleeve travel = 6.75 ± 0.25 mm
2. Idle - full load advance-angle range $34 - 42^\circ$
3. Sensing-lever setting: set lever at $n = 1000 \text{ min}^{-1}$.
Control lever in full-load position.
- 4 ** At appropriate speed, override control-rod travel by 0.4 ± 0.1 mm; there must be no effect on idle delivery.
5. Test pneumatic shut-off:
Control lever in idle position. Run fuel-injection pump at $n = 375 \text{ min}^{-1}$. Control rod must rapidly assume 0 mm control-rod travel at $P_u = 450 \text{ mbar}$ (338 mmHg) (vacuum).

Test Specifications Fuel Injection Pumps and Governors

En

PES5MW55/320RS12

RW350/2200 MW15

supersedes

2.79

company

Daimler-Benz

engine

OM 617

Cam sequence and angular spacing: See page 2!

1 - 2 - 4 - 3 = 0-72-144-216-288°

Angular cam spacing tolerance $\pm 0,50^\circ (\pm 0,75^\circ)$

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port closing at prestroke

1,7 - 1,8
(1,65- 1,85)

mm (from BDC)

21,0mm

Control rod travel

Rotational speed rev/min	Control rod travel mm	Fuel delivery cm ³ /100 strokes	Difference cm ³ /100 strokes	Control rod travel mm	Fuel delivery cm ³ /100 strokes	Spring pre-tensioning (compensating valve) mm
1	2	3	4	2	3	6
1000	13,5	3,75-3,85	0,25(0,3)			
350	+ 0,1 6,5 ± 0,1	0,65-0,75	0,1 (0,15)			
1600, 2180	Sect. C, col. 4,5	-	0,25(0,3)			

Set uniform delivery according to the values in

Checking values in brackets

Testoil-ISO 4113

B. Governor Settings

Lower rated speed			Upper rated speed			Variations in control rod travel		
Degree of deflection of control lever	Control rod travel mm	Rotational speed rev/min	Degree of deflection of control lever	Control rod travel mm	Rotational speed rev/min		Rotational speed rev/min	Control rod travel mm
1	2	3	4	5	6	7	8	9
30	① min. 11 ② 6,4-6,6 ③ ** ④ - ⑤ max. 2	150-220 350 360 - 650-700	68±4	⑦ 12,4±0,1 ⑧ 11,4 ⑨ 4,0 ⑩ max. 1,0 ⑪	2180 2280-2300 2670-2730 2850-2950		⑫ 100 ⑬ 1600 ⑭ 1000 2180 ⑮ Switching point 270-320(250-340)	20,5-21,5 12,9-13,1 13,5-13,6 12,3-12,5

C. Settings for Fuel Injection Pump with Governor Mounted

Full-load delivery ⑰		Full-load speed regulation ⑱a	Variations in fuel delivery ⑰		Starting fuel delivery idle		Difference
Test oil temp. 40°C (104°F)							
rev/min	cm ³ /1000 strokes	rev/min	rev/min	cm ³ /1000 strokes	rev/min	cm ³ /1000 strokes	cm ³ /1000 strokes
1	2	3	4	5	6	7	8
1000	37,5-38,5 (36,5-39,5)	2280-2300* (2275-2305)	1600	39,0-41,0 (38,0-42,0)	100	mind. 57,0	6,0 ⑫a
			2180	39,0-41,0 (38,0-42,0)	350	6,5 - 7,5 (6,0 - 8,0)	1,0 (1,5) ⑮
					2550	14,5 - 20,5 (13,5 - 21,5)	2,5 (3,0) ⑮

Checking values in brackets

less control rod travel than in Column 2

Note:

1. Sleeve idle-speed travel = 6.75 ± 0.25 mm
2. Advance-angle range, idle speed to full-load = $34 \dots 42^\circ$
3. ** (3) At this rotational speed applying force, increase the control-rod travel by 0.4 ± 0.1 mm. In doing so, the idle delivery must not be affected!
4. With $n = 1000 \text{ min}^{-1}$ (speed-control lever in full-load position), the control-rod travel can be reduced by a max. of 0.5 mm using the sensing pin.
(Fuel delivery adjustment aid.)
5. Test the pneumatic cut-off:
Control lever in the idle position. Drive the injection pump at $n = 350 \text{ min}^{-1}$. At $p_u = 450 \text{ bar}$ (338mm Hg) (vacuum), the control rod must quickly return to the travel position 0 mm.

Test Specifications Fuel Injection Pumps and Governors

VDT-WPP 001/4 MB 3,0 b

3. Edition

En

PES 5 MW 55/320 RS 4

RW 350/2200 MW 11

supersedes 7.77
company Daimler-Benz
engine OM 617

Cam sequence and angular spacing:

1 - 2 - 4 - 5 - 3 = 0 - 72 - 144 - 216 - 288° ± 0,5° (± 0,75°)

See page 2!

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port closing at prestroke

1,7 - 1,8 mm (from BDC)
(1,65- 1,85)

Control rod travel

Rotational speed rev./min	Control rod travel mm	Fuel delivery cm ³ /100 strokes	Difference cm ³ /100 strokes	Control rod travel mm	Fuel delivery cm ³ /100 strokes	Spring pre tensioning (compensating valve) mm
1	2	3	4	2	3	6
2180	12,1	3,7 - 3,8	0,25(0,3)			
350	6,5 (±0,1)	0,6 - 0,7	0,1 (0,15)			
1600 1000	- Sect. C, col. 4,5	- 0,25(0,3)				

Set uniform delivery according to the values in

Checking values in brackets

B. Governor Settings

Lower rated speed			Upper rated speed			Variations in control rod travel		
Degree of deflection of control lever	Control rod travel mm	Rotational speed rev./min	Degree of deflection of control lever	Control rod travel mm	Rotational speed rev./min		Rotational speed rev./min	Control rod travel mm
1	2	3	4	5	6	7	8	9
30	① min. 11	150-220	ca. 68	⑦ 12,1	2180		⑫ 100	20,5-21,5
./.	② 6,5	340-360	(± 4)	⑧ 11,1	2280-2300		⑬ 1600	12,4-12,6
	③ **	360		⑨ 6,8	2520-2580		⑭ 1000	12,8-13,0
	④ -	---		⑩ max. 1	2800-2950			
	⑤ max. 2	650-700		⑪ -	---		⑥ Switching point *** ./.	

C. Settings for Fuel Injection Pump with Governor Mounted

Full-load delivery Test oil temp. 40°C (104°F)		Full-load speed regulation		Variations in fuel delivery		Starting fuel delivery Idle		Difference	
rev./min	cm ³ /1000 strokes	rev./min		rev./min	cm ³ /1000 strokes	rev./min	cm ³ /1000 strokes	cm ³ /1000 strokes	
1	2	3		4	5	6	7	8	
2180	37,5-38,5 (36,5-39,5)	2280-2300* (2275-2305)		1600	38,0-40,0 (37,0-41,0)	100	min. 57	6,0	⑫a
				1000	35,0-37,0 (34,0-38,0)	350	6,5-7,5 (6,0-8,0)	1,0 (1,5)	⑬
						2520-2580	15,5-17,5 (14,5-18,5)	2,5 (3,0)	⑭

Checking values in brackets

less control rod travel than in Column 2

5.82

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Testoil-ISO 4113

Extended text in VDT-WPP 211/7.

Section 4

To be given consideration prior to text for 4.13:

Set pointer plate (2) to "12 000 ft".

To be given consideration after text for 4.13:

Set pointer plate (2) to "0 ft".

Check switching point and compare to set value in test specification sheet.

At speed "0" and pointer plate (2) set to "12 000 ft", moving control lever forwards must cause starting control-rod travel (12) to be attained.

Section 6

To be given consideration following text for 2nd expanded text:

Check change in control-rod travel per detent position = 0.5 - 0.7 mm.

Test specification sheet MB 3.0 b - front -

Idle guide-sleeve travel = 6.75 ± 0.25 mm

Idle:full load = 34 - 42° adjustment range must be complied with!

Load pick-up (increase in control-rod travel) when idling with $n = 350 - 150 \text{ min}^{-1}$ must be between 4 - 5 mm control-rod travel!

Re (3) setting auxiliary idle spring **

At this speed, override control-rod travel by 0.4 ± 0.1 mm; there must be no effect on idle delivery!

Re (6) switching point ***

Setting 300 - 320 (280 - 340) min^{-1} with reduced-delivery stop set to "12 000 ft".

Test max. 310 min^{-1} in "0 ft" setting of reduced-delivery stop

Test Specifications Fuel Injection Pumps and Governors

WPP 001/4 MB 3,0 1

3. Edition

En

PES 5 M 55 C 320 RS 105
RSF 350/2300 M 9

0 400 075 999 0 400 075 997

supersedes

11.79

company

Daimler-Benz

PES 5 M 55 C 320 RS 105
RSF 350/2300 M 10

0 400 075 998 0 400 075 996

engine

OM 617

See page 2!

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port closing at prestroke

1,70-1,80
(1,65-1,85)

mm (from BDC)

20,0mm

Control rod travel

Rotational speed rev/min	Control rod travel mm	Fuel delivery cm ³ /100 strokes	Difference cm ³ /100 strokes	Control rod travel mm	Fuel delivery cm ³ /100 strokes	Spring pre-tensioning (compensating valve) mm
1	2	3	4	2	3	6
1000	13,9+0,1	3,85 - 3,95	0,25(0,3)			
350	6,8-7,0	0,6 - 0,7	0,1 (0,15)			
1600	***		0,25(0,3)			
2200	***		0,25(0,3)			
*** Sect. C, col. 4,5						

Set uniform delivery according to the values in

Checking values in brackets

B. Governor Settings

Lower rated speed			Upper rated speed			Variations in control rod travel		
Degree of deflection of control lever	Control rod travel mm	Rotational speed rev/min	Degree of deflection of control lever	Control rod travel mm	Rotational speed rev/min		Rotational speed rev/min	Control rod travel mm
1	2	3	4	5	6	7	8	9
9-13	10,5	250-300	50	13,0-13,2	2200		100	min.20,3
(1)	6,8-7,0	350	(7)	9,5-9,9	2550		1600	13,6-13,8
(2)	**	370	(8)	-	-		1000	13,9-14,0
(3)	-	-	(9)	0,0-1,0	2950			
(4)	2,5	720-820	(10)	-	-			
(5)			(11)					
							Switching point	
							(6)	

C. Settings for Fuel Injection Pump with Governor Mounted

Full-load delivery (19)		Full-load speed regulation (8a)	Variations in fuel delivery (17)		Starting fuel delivery (18)		Difference
Test oil temp 40°C (104°F)					Idle		
rev/min	cm ³ /1000 strokes	rev/min	rev/min	cm ³ /1000 strokes	rev/min	cm ³ /1000 strokes	cm ³ /1000 strokes
1	2	3	4	5	6	7	8
2200	40,0-42,0 (39,0-43,0)	2550* RW=9,5-9,9	1600	39,5-41,5 (38,5-42,5)	100	min. 52,0	6,0 (12a)
			1000	38,5-39,5 (37,5-40,5)	350	6,0-7,0 (5,5-7,5)	1,0 (1,5)
					2550	23,5-27,5 (22,5-28,5)	2,5 RW- (15) (3,0) See Point 8 a (16)

Checking values in brackets

*3,4 less control rod travel than in Column 2

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4.80

1. Angular cam spacing:

1 - 2 - 4 - 5 - 3 = 0 - 72 - 144 - 216 - 288 \pm 0,5 (0,75)

2. ^{**} Auxiliary idle spring is to be adjusted at $n = 370 \text{ min}^{-1}$ that the control-rod travel is exceeded by 0.1 - 0.2 mm.

3. Setting the idle control-lever position:

$n = 1000 \text{ min}^{-1}$, control travel 1.9 - 2.0 mm

4. Checking the auxiliary idle spring shutoff:

Control-lever position = 45° . After the change-over point, the control lever does not alter its position until 550 min^{-1} .

Idle control-lever position = 28° . Speed range = $350 - 450 \text{ min}^{-1}$.

5. Checking the pneumatic shutoff aneroid box:

Lever at idle stop.

At $n = 375 \text{ min}^{-1}$ and $p_u = 450 \text{ mbar}$ (vacuum) (338 mm Hg) the control rod must return quickly to 0 mm travel position.

Test Specifications Fuel Injection Pumps and Governors

En

PES 4 M 55 C 320 RS 104)
 RSF 375/2300 M 12) 0 400 074 989 0 400 074 984
 PES 4 M 55 C 320 RS 104)
 RSF 375/2300 M 11) 0 400 074 990 0 400 074 983
 See page 2!

supersedes
company
engine

5.79
Daimler Benz
OM 616

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port closing at prestroke 1,70 - 1,80 mm (from BDC) 20 mm Control rod travel
 (1,65 - 1,85)

Rotational speed	Control rod travel	Fuel delivery	Difference	Control rod travel	Fuel delivery	Spring pre-tensioning (compensating valve)
rev/min	mm	cm ³ /100 strokes	cm ³ /100 strokes	mm	cm ³ /100 strokes	mm
1	2	3	4	2	3	6
1000	13,9+0,1	3,85 - 3,95	0,25(0,30)			
375	6,7-6,9	0,7 - 0,8	0,10(0,15)			

Set uniform delivery according to the values in

Checking values in brackets

B. Governor Settings

Lower rated speed			Upper rated speed			Variations in control rod travel		
Degree of deflection of control lever	Control rod travel	Rotational speed	Degree of deflection of control lever	Control rod travel	Rotational speed		Rotational speed	Control rod travel
1	mm	rev/min	4	mm	rev/min	7	rev/min	mm
1	2	3	4	5	6	7	8	9
11±2	11,0	250-300	50	13,0 ^{+0,2}	2200		100	min. 20,3
(1)	6,7-6,9	375	(7)	9,5-9,9	2550		1600	13,6-13,8
(2)	**	395	(8)	-	-		1000	13,9-14,0
(3)	--	-	(9)	0 - 1,0	2950			
(4)	2,5	720-820	(10)	-	-			
(5)			(11)					
							(6) Switching point	

C. Settings for Fuel Injection Pump with Governor Mounted

Full-load delivery		Full-load speed regulation	Variations in fuel delivery		Starting fuel delivery		Difference
Test oil temp. 40°C (104°F)					Idle		
rev/min	cm ³ /1000 strokes	rev/min	rev/min	cm ³ /1000 strokes	rev/min	cm ³ /1000 strokes	cm ³ /1000 strokes
1	2	3	4	5	6	7	8
2200	40,0-42,0 (39,0-43,0)	2550* RW=9,5-9,9	1600	39,5-41,5 (38,5-42,5)	100	min. 52,0	6,0
			1000	38,5-39,5 (37,5-40,5)	375	7,0-8,0 (6,5-8,5)	1,0 (1,5)
					2550	23,5-27,5 (22,5-28,5)	2,5 See (3,0) Point 8 a

Checking values in brackets

*3,5 less control rod travel than in Column 2

4.80

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Testoil-ISO 4113

1. Angular cam spacing:

$$1 - 3 - 4 - 2 = 0 - 90 - 180 - 270 \pm 0,50 (0,75)$$

**

2. Auxiliary idle spring is to be adjusted at $n = 395 \text{ min}^{-1}$ that the control-rod travel is exceeded by 0.1 - 0.2 mm.

3. Setting the idle control-lever position:

$$n = 1000 \text{ min}^{-1}, \text{ control travel } 1.9 - 2.0 \text{ mm}$$

4. Checking the auxiliary idle spring shutoff:

Control-lever position = 45° . After the change-over point, the control lever does not alter its position until 550 min^{-1} .

Idle control-lever position = 28° . Speed range = $350 - 450 \text{ min}^{-1}$.

5. Checking the pneumatic shutoff aneroid box:

Lever at idle stop.

At $n = 375 \text{ min}^{-1}$ and $p_v = 450 \text{ mbar (vacuum)}$ (338 mm Hg) the control rod must return quickly to 0 mm travel position.

Test Specifications Fuel Injection Pumps and Governors

WPP 001/4 MB 2,4 h

3. Edition

En

1. PES 4 M55C 320 RS 104 } 0 400 074 994 0 400 074 984
RSF 375/2300 M 8 }
2. PES 4M55 C 320 RS 104 } 0 400 074 991 0 400 074 983
RSF 375/2300 M 7 }

supersedes

company

engine

2.79

Daimler Benz
OM 616

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port closing at prestroke

1,70 - 1,80
(1,65 - 1,85)

mm (from BDC)

20 mm Control rod travel

Rotational speed	Control rod travel	Fuel delivery	Difference	Control rod travel	Fuel delivery	Spring pre-tensioning (compensating valve)
rev/min	mm	cm ³ /100 strokes	cm ³ /100 strokes	mm	cm ³ /100 strokes	mm
1	2	3	4	2	3	6
1000	13,9+0,1	3,85-3,95	0,25(0,3)			
375	6,7-6,9	0,7 - 0,8	0,1(0,15)			

Set uniform delivery according to the values in

Checking values in brackets

B. Governor Settings

Lower rated speed			Upper rated speed			Variations in control rod travel		
Degree of deflection of control lever	Control rod travel	Rotational speed	Degree of deflection of control lever	Control rod travel	Rotational speed		Rotational speed	Control rod travel
mm	rev/min		mm	rev/min		rev/min	mm	
1	2	3	4	5	6	7	8	9
11±2	11,0	250 - 300	50	13,0+0,2	2200		100	min.20,3
(1)	6,7-6,9	375	(7)	9,4-9,8	2550		1600	13,6-13,8
(2)	**	395	(8)	-	-		1000	13,9-14,0
(3)	-	-	(9)	0,0-1,0	2950			
(4)	2,5	720-820	(10)	-	-			
(5)			(11)					
							(6) Switching point	

C. Settings for Fuel Injection Pump with Governor Mounted

Full-load delivery (19)		Full-load speed regulation (8a)		Variations in fuel delivery (17)		Starting fuel delivery Idle (18)		Difference
Test oil temp 40°C (104°F)								
rev/min	cm ³ /1000 strokes	rev/min	rev/min	cm ³ /1000 strokes	rev/min	cm ³ /1000 strokes	cm ³ /1000 strokes	
1	2	3	4	5	6	7	8	
2200	40,0-42,0 (39,0-43,0)	2550* RW=9,4-9,8	1600	39,5-41,5 (38,5-42,5)	100	min.52,0		(12a)
			1000	38,5-39,5 (37,5-40,5)	375	7,0-8,0 (6,5-8,5)	1,0 (1,5)	(15)
					2550	22,5-26,5 (21,5-27,5)	2,5 (3,0)	See Point 8 a (16)

Checking values in brackets

*3,5 less control rod travel than in Column 2

4.80

Testoil-ISO 4113

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1. Angular cam spacing:

1 - 3 - 4 - 2 = 0 - 90 - 180 - 270 \pm 0,50 (0,75)

2. ** Auxiliary idle spring is to be adjusted at $n = 395 \text{ min}^{-1}$ that the control-rod travel is exceeded by 0.1 - 0.2 mm.

3. Setting the idle control-lever position:

$n = 1000 \text{ min}^{-1}$, control travel 1.9 - 2.0 mm

4. Checking the auxiliary idle spring shutoff:

Control-lever position = 45° . After the change-over point, the control lever does not alter its position until 550 min^{-1} .

Idle control-lever position = 28° . Speed range = $350 - 450 \text{ min}^{-1}$.

5. Checking the pneumatic shutoff aneroid box:

Lever at idle stop.

At $n = 305 \text{ min}^{-1}$ and $p_u = 450 \text{ mbar (vacuum)}$ (338 mm Hg) the control rod must return quickly to 0 mm travel position.

Test Specifications Fuel Injection Pumps and Governors

En

PES 6 MW 100/320 RS 5 Z RWV 300-1400 MW 4
See page 2!
Angular cam spacing tolerance

supersedes 7.77
company Volvo-Penta
engine DAMB 60 A

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port closing at prestroke 2,5 - 2,6 mm (from BDC) 10,5mm Control rod travel
(2,45- 2,65)

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Difference cm ³ /100 strokes 4	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Spring pre-tensioning (compensating valve) mm 6
1400	10,6	8,9 - 9,1	0,35(0,6)			
300	(+0,1) 5,1 (±0,1)	0,9 - 1,3	0,35(0,55)			
800	Sect. C, col. 4,5		0,5 (0,7)			

Set uniform delivery according to the values in

Checking values in brackets

Testoil-ISO 4113

B. Governor Settings

Lower rated speed			Upper rated speed			Variations in control rod travel		
Degree of deflection of control lever 1	Control rod travel mm 2	Rotational speed rev/min 3	Degree of deflection of control lever 4	Control rod travel mm 5	Rotational speed rev/min 6		Rotational speed rev/min 8	Control rod travel mm 9
26	(1) 8,5-9,5 (2) 5,0-5,2 (3) with contact (4) 2,0 (5)	100 300 310** 420 - 470	82±4 (7) (8) 9,6 (9) 4,0 (10) max. 1,0 (11)	10,6 1440-1450 1540-1580 1680 250-350	1400 1440-1450 1540-1580 1680 250-350		(12) 100 (13) 1400 (14) 800 500 Switching point (6) 100-220(80-230)	20,5-21,5 10,6-10,7 10,8-11,0 10,1-10,3

C. Settings for Fuel Injection Pump with Governor Mounted

Full-load delivery (19) Test oil temp 40°C (104°F)		Full-load speed regulation (8a)		Variations in fuel delivery (17) (18)		Starting fuel delivery Idle		Difference	
rev/min 1	cm ³ /1000 strokes 2	rev/min 3	rev/min 4	cm ³ /1000 strokes 5	rev/min 6	cm ³ /1000 strokes 7	cm ³ /1000 strokes 8		
1400	89,9-91,9 (87,9-93,9)	1440-1450*	800	86,8-90,8 (84,8-92,8)	100 300	max. RW 9,8-13,8 (7,3-16,3)	3,5 (5,5)	(12a)	(15)
								(16)	

Checking values in brackets

less control rod travel than in Column 2

Note:

1. Idle guide-sleeve travel = 4.25 ± 0.1
2. ** At this speed, override control-rod travel by 0.6 ± 0.1 mm; there must be no effect on idle delivery.
3. Set cut-in point of maximum-speed control spring at $CL = 40 \pm 5^\circ$.
There must be no uncontrolled stage.
4. Starting control-rod travel of approx. 21 mm must be attained when stopped.
(Check following setting of locking speed)

Test Specifications Fuel Injection Pumps and Governors

WPP 001/4 MB 2,0 g 2

3. Edition

En

PES 4 M 50 C 320 RS 103)

RSF 375/2300 M 14)

0 400 074 987 Sales model
0 400 074 985

supersedes

4.80

company

Daimler-Benz

engine

OM 615

See page 2!

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers.

A. Fuel Injection Pump Settings

Port closing at prestroke

1,70 - 1,80
(1,65 - 1,85)

mm (from BDC)

20 mm

Control rod travel

Rotational speed	Control rod travel	Fuel delivery	Difference	Control rod travel	Fuel delivery	Spring pre-tensioning (compensating valve)
rev/min	mm	cm ³ /100 strokes	cm ³ /100 strokes	mm	cm ³ /100 strokes	mm
1	2	3	4	2	3	6
1000	11,9+0,1	2,90-3,00	0,25(0,3)			
375	6,9-7,1	0,65-0,75	0,10(0,15)			

Set uniform delivery according to the values in

Checking values in brackets

B. Governor Settings

Lower rated speed			Upper rated speed			Variations in control rod travel		
Degree of deflection of control lever	Control rod travel	Rotational speed	Degree of deflection of control lever	Control rod travel	Rotational speed		Rotational speed	Control rod travel
1	mm	rev/min	4	mm	rev/min	7	rev/min	mm
1	2	3	4	5	6	7	8	9
13-17	11,5	250-300	50	11,2+0,2	2200		100min	20,3
(1)	6,9-7,1	375	(7)	8,1-8,5	2550		1600	11,5-11,7
(2)	**	395	(8)	-	-		1000	11,9-12,0
(3)	-	-	(9)	0 - 1,0	2950		(14)	
(4)	2,5	720-820	(10)	-	-		(6)	Switching point
(5)			(11)					

C. Settings for Fuel Injection Pump with Governor Mounted

Full-load delivery		Full-load speed regulation	Variations in fuel delivery		Starting fuel delivery		Difference
Test oil temp 40°C (104°F)					Idle		
rev/min	cm ³ /1000 strokes	rev/min	rev/min	cm ³ /1000 strokes	rev/min	cm ³ /1000 strokes	cm ³ /1000 strokes
1	2	3	4	5	6	7	8
2200	31,0-33,0 (30,0-34,0)	2550* RW=8,1-8,5	1600	29,5-31,5 (28,5-32,5) 29,0-30,0 (28,0-31,0)	100	min. 54,0	6,0
					375	5,4-7,5 (6,0-8,0)	1,0 (1,5)
					2550	17,5-21,5 (16,5-22,5)	2,5 (3,0)

Checking values in brackets

See control rod travel than in Column 2

1. ****** Auxiliary idle spring is to be adjusted at $n = 370 \text{ min}^{-1}$ that the control-rod travel is exceeded by 0.1 - 0.2 mm.
2. Setting the idle control-lever position:
 $n = 1000 \text{ min}^{-1}$, control travel 1.9 - 2.0 mm
3. Checking the auxiliary idle spring shutoff:
Control-lever position = 45° . After the change-over point, the control lever does not alter its position until 550 min^{-1} .
Idle control-lever position = 28° . Speed range = $350 - 450 \text{ min}^{-1}$.
4. Checking the pneumatic shutoff aneroid box:
Lever at idle stop.
At $n = 375 \text{ min}^{-1}$ and $p_v = 450 \text{ mbar}$ (vacuum) (338 mm Hg) the control rod must return quickly to 0 mm travel position.

Test Specifications Fuel Injection Pumps and Governors

En

PES 5 MW 55/320 RS 3
RS 3

RW 350/2200 MW 2
MW 10

supersedes 7.77
company Daimler-Benz
engine OM 617

Cam sequence and angular cam spring

1 - 2 - 4 - 5 - 3 = 0 - 72 - 144 - 216 - 288° See page 2!

Angular cam spacing tolerance $\pm 0,5^\circ$ ($\pm 0,75^\circ$)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port closing at prestroke 1,7 - 1,8 mm (from BDC) max. Control rod travel
(1,65-1,85)

Rotational speed	Control rod travel	Fuel delivery	Difference	Control rod travel	Fuel delivery	Spring pre-tensioning (compensating valve)
rev/min	mm	cm ³ /100 strokes	cm ³ /100 strokes	mm	cm ³ /100 strokes	mm
1	2	3	4	2	3	6
2180	12,4	3,9 - 4,0	0,25(0,3)			
350	6,5 ($\pm 0,1$)	0,6 - 0,7	0,1(0,15)			
1600 1000	Sect. C, col. 4,5	---	0,25(0,3)			

Set uniform delivery according to the values in

Checking values in brackets

B. Governor Settings

Lower rated speed			Upper rated speed			Variations in control rod travel		
Degree of deflection of control lever	Control rod travel	Rotational speed	Degree of deflection of control lever	Control rod travel	Rotational speed		Rotational speed	Control rod travel
1	mm	rev/min	4	mm	rev/min	7	rev/min	mm
30	min. 11	150-220	ca. 68	12,4	2180		100	20,5-21,5
(1)	6,5	340-360	(± 4)	11,4	2280-2300		1600	12,9-13,1
(2)	**	360	(8)	6,8	2520-2580		1000	13,4-13,6
(3)	-	-	(9)	max. 1	2800-2950			
(4)	max. 2	650-700	(10)	-	-			
(5)			(11)					
							Switching point 250-300(225-325)	

C. Settings for Fuel Injection Pump with Governor Mounted

Full-load delivery		Full-load speed regulation	Variations in fuel delivery		Starting fuel delivery		Difference
Test oil temp 40°C (104°F)					Idle		
rev/min	cm ³ /1000 strokes	rev/min	rev/min	cm ³ /1000 strokes	rev/min	cm ³ /1000 strokes	cm ³ /1000 strokes
1	2	3	4	5	6	7	8
2180	39,0-40,0 (38,0-41,0)	2280-2300* (2275-2305)	1600	39,0-41,0 (38,0-42,0)	100	min. 57	6,0
			1000	36,5-38,5 (35,5-41,0)	350	6,5-7,5 (6,0-8,0)	1,0 (1,5)
					2520-2580	15,5-17,5 (14,5-18,5)	2,5 (3,0)

Checking values in brackets

less control rod travel than in Column 2

Testoil-ISO 4113

Note:

1. Sleeve idle-speed travel = 6.75 ± 0.25 mm
2. Advance-angle range, idle speed to full-load = $34 \dots 42^\circ$
3. ** (3) At this rotational speed applying force, increase the control-rod travel by 0.4 ± 0.1 mm. In doing so, the idle delivery must not be affected!
4. VDT-WPP 211/7 (3.75) supersedes adjustment instructions on MB 3.0 a (9.74)!

Test Specifications Fuel Injection Pumps and Governors

VDT-WPP 001/4 MB 3,0 c

3. Edition

En

PES 5 MW 55/320 RS 4

RW 350/2200 MW 3

supersedes

7.77

company

Daimler-Benz

engine

OM 617

See page 2!

Cam sequence and angular cam spring

1 - 2 - 4 - 5 - 3 = 0 - 72 - 144 - 216 - 288 ± 0,5° (±0,75°)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port closing at prestroke

1,7 - 1,8
(1,65-1,85)

mm (from BDC)

max.

Control rod travel

Rotational speed rev/min	Control rod travel mm	Fuel delivery cm ³ /100 strokes	Difference cm ³ /100 strokes	Control rod travel mm	Fuel delivery cm ³ /100 strokes	Spring pre-tensioning (compensating valve) mm
1	2	3	4	2	3	6
2180	12,1	3,7-3,8	0,25(0,3)			
350	6,5 (±0,1)	0,6-0,7	0,1(0,15)			
1600 1000	(Sect. C, col. 4,5) -	0,25(0,3)				

Set uniform delivery according to the values in

Checking values in brackets

Testoil-ISO 4113

B. Governor Settings

Lower rated speed			Upper rated speed			Variations in control rod travel		
Degree of deflection of control lever	Control rod travel mm	Rotational speed rev/min	Degree of deflection of control lever	Control rod travel mm	Rotational speed rev/min		Rotational speed rev/min	Control rod travel mm
1	2	3	4	5	6	7	8	9
30	10,5-11,5	150-220	ca. 68	12,1	2180		100	20,5-21,5
1	6,5	340-360	(±)	11,1	2280-2300		1600	12,4-12,6
2	**	360		6,8	2520-2580		1000	12,8-13,0
3	-	---		max. 1	2800-2950			
4	max. 2	650-700						
5								
							Switching point	
							250-300(225-325)	

C. Settings for Fuel Injection Pump with Governor Mounted

Full-load delivery		Full-load speed regulation		Variations in fuel delivery		Starting fuel delivery Idle		Difference
Test oil temp 40°C (104°F)								
rev/min	cm ³ /1000 strokes	rev/min	rev/min	rev/min	cm ³ /1000 strokes	rev/min	cm ³ /1000 strokes	cm ³ /1000 strokes
1	2	3	4	5	6	7	8	
2180	37,5-38,5 (36,5-39,5)	2280-2300* (2275-2305)	1600	38,0-40,0 (37,0-41,0)	100	mind. 57	6,0	(12a)
			1000	35,0-37,0 (34,0-38,0)	350	6,5-7,5 (6,0-8,0)	1,0 (1,5)	(15)
					1520-2580	15,5-17,5 (14,5-18,5)	2,5 (3,0)	(16)

Checking values in brackets

less control rod travel than in Column 2

Notes:

1. Sliding-sleeve idle travel = 6.75 ± 0.25 mm
2. Advance angle in idle - full load range = $34 - 42^\circ$
3. ** 3 At this engine speed, exceed control-rod travel by 0.4 ± 0.1 mm; idle delivery must not be affected!
4. ***- "12.1 mm" - is the full-load control-rod travel set in Section A, 1-3.

Test Specifications Fuel Injection Pumps and Governors

WPP 001/4 MB 2,0 g 3

2. Edition

En

PES 4 M 50 C 320 RS 103) 0 400 074 988
RSF 375/2300 M 13)
See page 2!
Sales model 0 400 074 986

supersedes 3.79
company Daimler-Benz
engine OM 615

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port closing at prestroke $1,70 - 1,80$ mm (from BDC) Control rod travel
 $(1,65 - 1,85)$ 20 mm

Rotational speed rev/min	Control rod travel mm	Fuel delivery cm ³ /100 strokes	Difference cm ³ /100 strokes	Control rod travel mm	Fuel delivery cm ³ /100 strokes	Spring pre-tensioning (compensating valve) mm
1	2	3	4	2	3	6
1000	12,7+0,1	3,20 - 3,30	0,25(0,30)			
375	6,9-7,1	0,65 - 0,75	0,1(0,15)			

Set uniform delivery according to the values in

Checking values in brackets

B. Governor Settings

Lower rated speed			Upper rated speed			Variations in control rod travel		
Degree of deflection of control lever	Control rod travel mm	Rotational speed rev/min	Degree of deflection of control lever	Control rod travel mm	Rotational speed rev/min		Rotational speed rev/min	Control rod travel mm
1	2	3	4	5	6	7	8	9
13-17	11,5	250-300	50	12,0+0,2	2200		100	min.20,3
	6,9-7,1	375		8,6-9,0	2550		1600	12,4-12,6
	**	395		-	-		1000	12,7-12,8
	-	-		0-1,0	2950			
	2,5	720-820		-	-			
							Switching point	

C. Settings for Fuel Injection Pump with Governor Mounted

Full-load delivery (19)		Full-load speed regulation (8a)	Variations in fuel delivery (17)		Starting fuel delivery (18)		Difference
Test oil temp 40°C (104°F)							
rev/min	cm ³ /1000 strokes	rev/min	rev/min	cm ³ /1000 strokes	rev/min	cm ³ /1000 strokes	cm ³ /1000 strokes
1	2	3	4	5	6	7	8
2200	33,5-35,5 (32,5-36,5)	2550* RW=8,6-9,0	1600	32,5-34,5 (31,5-35,5)	100	min.54,0	6,0 (12a)
			1000	32,0-33,0 (31,0-34,0)	375	6,5-7,5 (6,0-8,0)	1,0 (1,5) (15)
					2550	20,5-24,5 (19,5-25,5)	2,5 (3,0) See point 8a (16)

Checking values in brackets

*3,9 less control rod travel than in Column 2

Testoil-ISO 4113

1. ** Position the idle-speed auxiliary spring at $n = 395 \text{ min}^{-1}$ so that the control-rod travel is forced further by 0.1 - 0.2 mm.
2. Adjusting the idle control-lever position:
At 1000 min^{-1} , control-rod travel 1.9 - 2.0 mm
3. Testing the idle-speed auxiliary spring shutoff
Control-lever position 45° . No change in control-rod travel after switching point up to 550 min^{-1} .
Control-lever position 28° . Rotational-speed range 350 min^{-1} - 450 min^{-1} .
4. Testing the pneumatic shutoff box
Control lever against idle stop.
At $n = 375 \text{ min}^{-1}$ and 450 mbar (vacuum) (338 mmHg) the control rod must move briskly to RW (control-rod travel) = 0 mm.

Test Specifications Fuel Injection Pumps and Governors

En

PES 4 M 50 C 320 RS 103
RSF 375/ 2300 M 5
Komb.Nr. 0 400 074 996
1 - 3 - 4 - 2 = 0 - 90 - 180 - 270 \pm 0,5(0,75°)
Sales model 0 400 074 985

See page 2!

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

supersedes 2.79
company Daimler Benz
engine OM 615

A. Fuel Injection Pump Settings

Port closing at prestroke 1,70-1,80 mm (from BDC) 20 mm Control rod travel
(1,65-1,85)

Rotational speed rev/min	Control rod travel mm	Fuel delivery cm ³ /100 strokes	Difference cm ³ /100 strokes	Control rod travel mm	Fuel delivery cm ³ /100 strokes	Spring pre-tensioning (compensating valve) mm
1	2	3	4	2	3	6
1000	11,9±0,1	2,90-3,00	0,25(0,3)			
375	6,9-7,1	0,65-0,75	0,10(0,15)			

Set uniform delivery according to the values in

Checking values in brackets

B. Governor Settings

Lower rated speed			Upper rated speed			Variations in control rod travel		
Degree of deflection of control lever	Control rod travel mm	Rotational speed rev/min	Degree of deflection of control lever	Control rod travel mm	Rotational speed rev/min		Rotational speed rev/min	Control rod travel mm
1	2	3	4	5	6	7	8	9
13+4	① 11-11,5 ② 6,9-7,1 ③ ** ④ - ⑤ 2,5	250-300 375 395 - 720-820	50	⑦ 11,2-11,4 ⑧ 8,1-8,5 ⑨ - ⑩ 0 - 1,0 ⑪ -	2200 2550 - 2950 -		⑫ 100 ⑬ 1600 ⑭ 1000	min. 20,3 11,5-11,7 11,9-12,0
							⑥ Switching point	

C. Settings for Fuel Injection Pump with Governor Mounted

Full-load delivery ①9		Full-load speed regulation ⑧a	Variations in fuel delivery ①7		Starting fuel delivery idle ①8		Difference
Test oil temp 40°C (104°F)							
rev/min	cm ³ /1000 strokes	rev/min	rev/min	cm ³ /1000 strokes	rev/min	cm ³ /1000 strokes	cm ³ /1000 strokes
1	2	3	4	5	6	7	8
2200	31,0-33,0 (30,0-34,0)	2550* RW=8,1-8,5	1600	29,5-31,5 (28,5-32,5)	100	min. 54,0	⑫a
			1000	29,0-30,0 (28,0-31,0)	375	6,5-7,5 (6,0-8,0)	1,0 (1,5) ⑮
					2550	17,5-21,5 (16,5-22,5)	2,5 (3,0) See point 8a ⑮

Checking values in brackets

*3,0 less control rod travel than in Column 2

Testoil-ISO 4113

1. ** Position the idle-speed auxiliary spring at $n = 395 \text{ min}^{-1}$ so that the control-rod travel is forced further by 0.1 - 0.2 mm.
2. Adjusting the idle control-lever position:
At 1000 min^{-1} , control-rod travel 1.9 - 2.0 mm
3. Testing the idle-speed auxiliary spring shutoff
Control-lever position 45° . No change in control-rod travel after switching point up to 550 min^{-1} .
Control-lever position 28° . Rotational-speed range 350 min^{-1} - 450 min^{-1} .
4. Testing the pneumatic shutoff box
Control lever against idle stop.
At $n = 375 \text{ min}^{-1}$ and 450 mbar (vacuum) (338 mmHg) the control rod must move briskly to RW (control-rod travel) = 0 mm.

Test Specifications Fuel Injection Pumps and Governors

En

PES 4 M 50 C 320 RS 103

RSF 375/2300 M 3

Sales model 0 400 074 986

Kombination Nr. 0 400 074 998

1 - 3 - 4 - 2 = 0 - 90 - 180 - 270 ± 0,5(0,75°)

See page 2!

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

supersedes

2.79

company

Daimler Benz

engine

OM 615

A. Fuel Injection Pump Settings

Port closing at prestroke $1,70 - 1,80$ mm (from BDC) 20 mm Control rod travel
 $(1,65 - 1,85)$

Rotational speed	Control rod travel	Fuel delivery	Difference	Control rod travel	Fuel delivery	Spring pre-tensioning (compensating valve)
rev/min	mm	cm ³ /100 strokes	cm ³ /100 strokes	mm	cm ³ /100 strokes	mm
1	2	3	4	2	3	6
1000	12,7+0,1	3,20 - 3,30	0,25(0,3)			
375	6,9-7,1	0,65 - 0,75	0,10(0,15)			

Set uniform delivery according to the values in

Checking values in brackets

B. Governor Settings

Lower rated speed			Upper rated speed			Variations in control rod travel		
Degree of deflection of control lever	Control rod travel	Rotational speed	Degree of deflection of control lever	Control rod travel	Rotational speed		Rotational speed	Control rod travel
1	mm	rev/min	4	mm	rev/min	7	rev/min	mm
13+4	11-11,5	250-300	50	12,0-12,2	2200		100	min.20,3
	6,9-7,1	375		8,6-9,0	2550		1600	12,4-12,6
	**	395		-	-		1000	12,7-12,8
	-	-		0-1,0	2950			
	2,5	720-820		-	-			
							Switching point	

C. Settings for Fuel Injection Pump with Governor Mounted

Full-load delivery		Full-load speed regulation	Variations in fuel delivery		Starting fuel delivery		Difference
Test oil temp 40°C (104°F)					Idle		
rev/min	cm ³ /1000 strokes	rev/min	rev/min	cm ³ /1000 strokes	rev/min	cm ³ /1000 strokes	cm ³ /1000 strokes
1	2	3	4	5	6	7	8
2200	33,5-35,5 (32,5-36,5)	2550* RW=8,6-9,0	1600	32,5-34,5 (31,5-35,5)	100	min.54,0	
			1000	32,0-33,0 (31,0-34,0)	375	6,5-7,5 (6,0-8,0)	1,0 (1,5)
					2550	20,5-24,5 (19,5-25,5)	2,5 see (3,0) Point 8a

Checking values in brackets

*ca 3,5 less control rod travel than in Column 2

1. ** Position the idle-speed auxiliary spring at $n = 395 \text{ min}^{-1}$ so that the control-rod travel is forced further by 0.1 - 0.2 mm.
2. Adjusting the idle control-lever position:
At 1000 min^{-1} , control-rod travel 1.9 - 2.0 mm
3. Testing the idle-speed auxiliary spring shutoff
Control-lever position 45° . No change in control-rod travel after switching point up to 550 min^{-1} .
Control-lever position 28° . Rotational-speed range 350 min^{-1} - 450 min^{-1} .
4. Testing the pneumatic shutoff box
Control lever against idle stop.
At $n = 375 \text{ min}^{-1}$ and 450 mbar (vacuum) (338 mmHg) the control rod must move briskly to RW (control-rod travel) = 0 mm.

Test Specifications Fuel Injection Pumps (1A) and Governors

40

WPP 001/4

3. Edition

En

PE 6 A 95 D 412 RS2305

EP/RSV 250-1225 A1 B562DL

supersedes

7.78

company

Bosch

engine

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port closing at prestroke (1,85-2,05)
1,90-2,00 mm (from BDC)

Rotational speed rev/min	Control rod travel mm	Fuel delivery cm ³ /100 strokes	Difference cm ³ /100 strokes	Control rod travel mm	Fuel delivery cm ³ /100 strokes	Spring pre tensioning (torque control valve) mm
1	2	3	4	2	3	6
1200	12,2-12,3	9,4-9,6	0,3(0,6)			
250	8,0- 8,2	0,9-1,5	0,3(0,5)			
600	- - -	C, 4-5	0,4(0,7)			

Adjust the fuel delivery from each outlet according to the values in

B. Governor Settings

1 Upper rated speed rev/min			Intermediate rated speed			4 Lower rated speed			3 Torque control	
Degree of deflection of control lever	Control rod travel mm	Control rod travel mm rev/min				Control lever deflection in degrees	rev/min	Control rod travel mm	rev/min	Control rod travel mm
1	2	3	4	5	6	7	8	9	10	11 + 0,1
loose	800	0,3-1,0				ca. 26	250	5,5		
	x	= 5,2					100	min. 19	1225	12,2
ca. 67	1265-1275	= 11,2					250	5,9-6,1	800	12,7
2a	1290-1320	= 5,0					420-480	= 2,0		
	1400	0,3- 1,0					600	0 - 1	600	12,7

The numbers denote the sequence of the tests

C. Settings for Fuel Injection Pump with Fitted Governor

2b Full-load stop		6 Rotational-speed limit		3a Fuel delivery characteristics		Starting fuel delivery 5		4a Idle stop	
Test oil temp. 40°C (104°F)		Note changed to 1 rev/min				Idle			
rev/min	cm ³ /1000 strokes			rev/min	cm ³ /1000 strokes	rev/min	cm ³ /1000 strokes	rev/min	Control rod travel mm
1	2	3		4	5	6	7	8	9
LDA 1200	0,7 bar 92,5-89,5 (90,5-96,5)	1265-1275*		LDA 600	0,7 bar 88,0-91,0 (86,0-93,0)	100	mm RW 14,7-15,3		
				LDA 600	0 bar 67,0-70,0 (65,0-72,0)				

Checking values in brackets

* 1 mm less control rod travel than col. 2

E14

BOSCH

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EAU

4.80

D. Adjustment Test for Manifold Pressure Compensator

Ppe 2305

-2-

Test at n = 500 rev/min decreasing pressure - in bar gauge pressure
increasing

Pump/governor	Setting Gauge pressure = bar	Measurement Gauge pressure = bar	Control rod travel - diminution difference mm (1)
2305 / 562DL	0,68	0,22 0	12,5 - 12,6 12,3 - 12,4 11,2 - 11,4

Notes

(1) when n =

rev/min and
gauge pressure =

bar (= maximum full-load control rod travel)

Test Specifications Fuel Injection Pumps ② and Governors

En

PE 6 P 120 A 720 RS 7001

RQ 250/1000 PA 615 (1)

RQV 250 1000 PA 612 (2)

supersedes -

company

Scania

engine

DN 11

151 kW (205PS)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

from FD 141: 5,0-5,1 to FD 052: 4,4 - 4,5 mm
 Port closing at prestroke (4,95-5,15) mm (from BDC) (4,35- 4,55)

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Difference cm ³ /100 strokes 4	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1000	11,3±0,1	18,6 - 18,7	0,5(0,9)			3,3 ± 0,1**
250	4,0-4,2	0,9 - 1,3	0,5(0,8)			(3,0 - 3,5)
** Due to smoothing of the sealing edge, the initial spring tension with a new delivery-valve holder must be adjusted to 3,0 -0,1 mm						

Adjust the fuel delivery from each outlet according to the values in

B. Governor Settings

..PA 615 (1)

Checking of slider PRG check rev/min 1		Full-load speed regulation Setting point rev/min 3		Test specifications Control rod travel mm 5 rev/min 6		Idle speed regulation Setting point rev/min 7		Test specifications Control rod travel mm 9 rev/min 10		Torque control rev/min 11 Control rod travel mm 12	
600	15,6-16,4	600	16,0	10,3 4,0	1045-1060 1105-1135	250	4,1	100 250 300-340 = 2,0mm	min.5,6 4,0-4,2	-	-

Torque-control travel
on flyweight assembly dimension a =

mm

Speed regulation: At 1045-1060 min⁻¹1 mm less control
rod travel

C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery on governor control lever Test oil temp. 40°C (104°F) rev/min 1		Control rod stop rev/min 3		Fuel delivery characteristics rev/min 4		Starting fuel delivery Idle speed rev/min 6	
	cm ³ /-1000 strokes 2				cm ³ /-1000 strokes 5		Control rod travel mm 7
1000	185,0-187,0 (182,0-190,0)	-		600	166,0-170,0 (163,0-173,0)	100	240,0-290,0 20-21 mmRW

Checking values in brackets

5.81

Testoil-ISO 4113

B. Governor Settings

..PA 612 (2)

SCA 11,0 u 2

Upper rated speed			Intermediate rated speed			Lower rated speed			Sliding sleeve travel	
Degree of deflection of control lever	rev/min Control rod travel mm	Control rod travel mm rev/min	Degree of deflection of control lever	rev/min	Control rod travel mm	Degree of deflection of control lever	rev/min	Control rod travel mm	rev/min	mm
1	2	3	4	5	6	7	8	9	10	11
max.	1000 1250	15,2-17,8 0 - 1,0	-	-	-	ca. 10	100 250	min. 5,6 4,0-4,2	200 500 800 1000	1,0-1,2 3,6-4,0 5,6-5,8 7,7
ca. 59	10,3 4,0	1040-1050 1120-1150				260-365 (3a)				

Torque control travel a = mm

C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp. 40°C (104°F)		Rotational speed limitation intermediate speed	Fuel delivery characteristics high idle speed		Starting fuel delivery idle switching point		Torque-control travel	
rev/min	cm ³ /1000 strokes	rev/min	rev/min	cm ³ /1000 strokes	rev/min	cm ³ /1000 strokes	rev/min	Control rod travel mm
1	2	3	4	5	6	7	8	9
1000	185,0-187,0 (182,0-190,0)	1040-1050*	600	166,0-170,0 (163,0-173,0)				

Checking values in brackets

* 1 mm less control rod travel than col. 2

D. Adjustment Test for Manifold Pressure CompensatorTest at n = rev/min decreasing pressure - in bar gauge pressure
increasing

Pump/governor	Setting	Measurement	Control rod travel- diminution difference
	Gauge pressure = bar	Gauge pressure = bar	mm

En

②

Test Specifications Fuel Injection Pumps ② and Governors

40

WPP 001/4 MB 11,4 i 4

1. Edition

En

PES 6 P 120 A 820 LS 3077 RQ 300/1100 PA 606

supercedes

company

engine

-
Daimler Benz
OM 407 A
206 kW(280 PS)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port closing at prestroke $4,0 - 4,1$
(3,95-4,15) mm (from BDC)

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Difference cm ³ / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1100	12,0+0,1	18,3 - 18,5	0,5(0,9)			
300	5,0-5,2	1,4 - 2,2	0,8(1,2)			

Values only apply to test nozzle-and-holder assembly 1 688 901 019 and fuel-injection test tubing 1 680 750 067.

Adjust the fuel delivery from each outlet according to the values in

B. Governor Settings

Checking of slider PRG check ①		Full-load speed regulation Setting point ④				Idle speed regulation Setting point ⑤				Torque control ③	
rev/min 1	Control rod travel mm 2	rev/min 3	Control rod travel mm 4	Control rod travel mm 5	rev/min 6	rev/min 7	Control rod travel mm 8	rev/min 9	Control rod travel mm 10	rev/min 11	Control rod travel mm 12
650	19,2-20,8	650	20,0	11,0 4,0	1145-1160 1190-1220	300	4,9	100 300 360-400	min.6,5 4,8-5,0 =2,0	1100 1000 900	12,0+0,1 12,2+0,1 12,5+0,1

Torque-control travel on flyweight assembly dimension a = 0,2 mm Speed regulation: At 1145-1160 min⁻¹ 1 mm less control rod travel

C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery on governor control lever Test oil temp. 40°C (104°F) ②		Control rod stop ③a	Fuel delivery characteristics ③b		Starting fuel delivery Idle speed ⑥	
rev/min 1	cm ³ /-1000 strokes 2	rev/min 3	rev/min 4	cm ³ /-1000 strokes 5	rev/min 6	cm ³ /1000 strokes/mm 7
LDA 1100	0,7 bar 183,0-185,0 (180,0-188,0)	-	LDA 600	0,7 bar 185,0-191,0 (182,0-194,0)	100	150,0-170,0
			LDA 500	0 bar 142,0-144,0 (139,0-147,0)		

Checking values in brackets

6.82

E18

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Geschäftsbereich KH. Kundendienst Kfz-Ausrüstung
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E18

D. Adjustment Test for Manifold Pressure Compensator

-2-

Test at n = 500 rev/min decreasing pressure - in bar gauge pressure
increasing

MB 11,4 i 4

Pump/governor	Setting Gauge pressure = bar	Measurement Gauge pressure = bar	Control rod travel - diminution difference mm (1)
PES 6 P..LS 3077 / ..PA 606	0,42	0,70 0 0,31	12,2 - 12,3 12,5 - 12,6 10,7 - 10,8 11,3 - 11,4

Notes:

(1) when n =

rev/min and
gauge pressure =

bar (= maximum full-load control rod travel)

B. Governor Settings

RQV .. 194 D

Ppe 237

Upper rated speed			Intermediate rated speed			Lower rated speed			Sliding sleeve travel	
Degree of deflection of control lever	rev/min Control rod travel mm	Control rod travel mm rev/min	Degree of deflection of control lever	rev/min	Control rod travel mm	Degree of deflection of control lever	rev/min	Control rod travel mm	rev/min	mm
1	2	3	4	5	6	7	8	9	10	11
ca. 60	1100 1150 1200 1280 1360	15,0-18,0 11,0-15,0 6,6-11,8 0 - 6,2 0	-	-	-	ca. 12	180 250 350 490	6,4-8,0 3,7-6,1 1,9-3,3 0	1100	8,2
						(3a)				

Torque control travel a = 0 mm

C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp. 40°C (104°F)		Rotational-speed limitation intermediate speed		Fuel delivery characteristics high idle speed		Starting fuel delivery idle switching point		Torque-control travel	
rev/min	cm ³ /1000 strokes	rev/min	cm ³ /1000 strokes	rev/min	cm ³ /1000 strokes	rev/min	cm ³ /1000 strokes	rev/min	Control rod travel mm
1	2	3	4	5	6	7	8	9	
LDA	0,7 bar	0,7 bar	LDA	0 bar	100	216,0-236,0			
1100	211,0-213,0	1130	1100	167,0-171,0		Change-over point 130-200 min ⁻¹			

Checking values in brackets

* 1 mm less control rod travel than col. 2

D. Adjustment Test for Manifold Pressure Compensator
 Test at n = 500 rev/min decreasing pressure - in bar gauge pressure (1)
 increasing pressure - in bar gauge pressure (2)

Pump/governor	Setting Gauge pressure = bar	Measurement Gauge pressure = bar	Control rod travel- diminution difference mm
237 / 193 D	0,46 - 0,50	0,10-0,18	- 0,1 mm (1) - 2,3 mm
237 / 194 D	0,09 - 0,11	0,24-0,30	ca. 1,4 (2)

En

1000

0,7

Testoil-ISO 4113

Test Specifications Fuel Injection Pumps and Governors

PES 5 MW 55/320 RS 16
RW 375/2200 MW 29
0 403 245 015
0 403 245 017 - Sales model
See page 2!

supersedes 12.80
company Daimler Benz
engine OM 617 A

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port closing at prestroke 2,10-2,20 mm (from BDC) 21 mm Control rod travel
(2,05-2,25)

without altitude-pressure compensator

Rotational speed	Control rod travel	Fuel delivery	Difference	Control rod travel	Fuel delivery	Spring pre tensioning (compensating valve)
rev/min	mm	cm ³ /100 strokes	cm ³ /100 strokes	mm	cm ³ /100 strokes	mm
1	2	3	4	2	3	6
1000	13,6+0,1	5,35-5,45	0,25(0,3)			
375	4,8-4,9	0,6-0,7	0,10(0,15)			
1600			0,25(0,3)			
2180			0,25(0,3)			

Set uniform delivery according to the values in

Checking values in brackets

B. Governor Settings

without altitude-pressure compensator

Lower rated speed			Upper rated speed			Variations in control rod travel		
Degree of deflection of control lever	Control rod travel	Rotational speed	Degree of deflection of control lever	Control rod travel	Rotational speed		Rotational speed	Control rod travel
1	mm	rev/min	4	mm	rev/min	7	rev/min	mm
27-31	min. 11	100	69	11,9-12,1	2180		100	20,5-21,5
	max. 11	320		11,0	2300-2320		1600	12,9-13,1
	**	375		4,0	2620-2720		1000	13,6-13,7
	-	-		0,0-1,0	2950			
	-	-						
							Switching point	
							270-320 (250-340)	

Testoil-ISO 4113

C. Settings for Fuel Injection Pump with Governor Mounted

Full-load delivery		Full-load speed regulation	Variations in fuel delivery		Starting fuel delivery		Difference
Test oil temp 40°C (104°F)					Idle		
rev/min	cm ³ /1000 strokes	rev/min	rev/min	cm ³ /1000 strokes	rev/min	cm ³ /1000 strokes	cm ³ /1000 strokes
1	2	3	4	5	6	7	8
2180	50,0-52,0 (49,0-53,0)	2300-2320* (2290-2330)	1600	52,0-53,5 (51,0-54,5)	100min.	55,0	6,0 (12a)
			1000	53,5-54,5 (52,5-55,5)	375	6,0-7,0 (5,5-9,5)	1,0 (1,5) (15)
					2550	24,0-27,0 (23,0-28,0)	2,5 (3,0) (16)

Checking values in brackets

less control rod travel than in Column 2

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Testing with ALDA

Point	min ⁻¹	cm ³ /1000 H	RW	Pressure (absolute)
18	1000	53,5 - 54,5 (52,5 - 55,5)	13,6 - 13,7	1733 mbar(1300 mmHg)
18a	*** 1000	42,5 - 44,5 (41,5 - 45,5)	-	1067 mbar(800 mmHg)
19	2180	50,0 - 52,0 (49,0 - 53,0)	11,9 - 12,1	1733 mbar (1300 mmHg)
12a	100	min. 55	20,5 - 21,5	1733 mbar (1300 mmHg)
15	375	6,0 - 7,0 (5,5 - 9,5)	4,8 - 4,9	978 mbar (740 mmHg)

1. Adjusting the idle

Test supersedes Section 4.1 of test instructions VDT-W-420/300
Suppl. 2, Ed. 2.

Set the control lever to an angle of 69°. Operate the fuel-injection pump at 1000 min⁻¹.

Screw in the spring retainer until a control-rod travel of 13,6 - 13,7 mm is reached.

Set the control lever to an angle of 49°. Operate the fuel-injection pump at 1000 min⁻¹. Control-rod travel 8,6 - 9,3 must be reached.

2. Adjusting the lower rated speed

Text supersedes Section 4.3 of test instructions VDT-W 420/300
Suppl. 2, Ed. 2.

Operate the fuel-injection pump at $n = 800 \text{ min}^{-1}$. Take back the control lever until a control-rod travel of 1.0 - 1.3 mm is reached.

Testoil-ISO 4113

The resulting deflection of the control lever must be within the allowable tolerance. Fix the control lever in this position. Drive the fuel-injection pump at a speed according to Point 2 Section B of the test specification sheet. Set regulation at adjusting screw (28).

3. Adjusting the idle-speed auxiliary spring (70)

- ** Position the idle-speed auxiliary spring in contact as the characteristic curve levels off at $n=520-550 \text{ min}^{-1}$.

4. Adjusting the sensing lever

Place the control lever against the full-load stop.

Operate the fuel-injection pump at $n = 375 \text{ min}^{-1}$. Adjust the sensing lever so that the control-rod travel is 0.1 (0.1 - 0.2) mm above the full-load control-rod travel at $n = 1000 \text{ min}^{-1}$.

5. *** Correct the quantity of fuel injected at the correction screw of the ALDA aneroid box. Max. correction $\pm 0.75 \text{ mm}$ control-rod travel.

6. Pin projection = $16.65 \pm 0.1 \text{ mm}$

7. Shutoff check: Operate the fuel-injection pump at $n = 200 \text{ min}^{-1}$. Force the control rod through the spring-loaded idle stop. The resulting control-rod travel must be max. 5 mm.

8. Test the pneumatic shutoff: Control lever in idle position. Operate the fuel-injection pump at $n = 375 \text{ min}^{-1}$. At 450 mbar (338 mmHg) (vacuum) the control rod must move briskly to control-rod travel 0 mm.

9. Control-lever range idle - full load = $38 - 42^\circ$.

Testoil-ISO 4113

Test Specifications Fuel Injection Pumps ② and Governors

En

PE 6 P 110 A 720 RS3005 RQ 250/1100 PA 410R

supersedes

company

engine

Scania

DS 11

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port closing at prestroke $\frac{3,30-3,40}{(3,25-3,45)}$ mm (from BDC)

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Difference cm ³ / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1100	12,3	13,5 - 13,7	0,4(0,8)			2,5±0,1** (max.2,2-2,9)
225	+ 0,1 5,8-6,0	0,6 - 2,0	0,2(0,4)			
600	- - - -	C, 4 - 5	0,6(1,0)			

Adjust the fuel delivery from each outlet according to the values in

Testoil-ISO 4113

B. Governor Settings

Checking of slider PRG check rev/min 1		Full-load speed regulation Setting point rev/min 3				Idle speed regulation Setting point rev/min 7				Torque control rev/min 11	
Control rod travel mm 2		Test specifications Control rod travel mm 4				Test specifications Control rod travel mm 10				Control rod travel mm 12	
700	15,6-16,4	700	16,0	11,3	1145-1160	225	5,9	100	min.7,5	-	-
				4,0	1230-1260			225	5,8-6,0		
1100	15,6-16,0							330-390	= 2,0		
1400	0 - 1										

Torque-control travel
on flyweight assembly dimension a =

mm

Speed regulation At

1 mm less control
rod travel

C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery on governor control lever Test oil temp 40°C (104°F) rev/min 1		Control rod stop rev/min 3		Fuel delivery characteristics rev/min 4		Starting fuel delivery idle speed rev/min 6	
cm ³ /1000 strokes 2		3a		3b		6	
1100	135,0-137,0 (132,0-140,0)	***		600	132,5-135,5 (129,5-138,5)	100	190-240
						225	8 - 12**
						245	6,1 mm RW dispersion max.4(7)

Checking values in brackets

7.79

Adjustment instructions:

- **** In the case of greater scatter, change the initial tension of the delivery-valve spring accordingly.

More pretension gives more fuel delivery when idling.

- ***** Adjust the full-load delivery at the excess fuel stop. Preset the control lever by 3° more i.e. 1.5 mm more control-rod travel, in order that starting control-rod travel is reached.

Start-of-delivery test without -- Start-of-delivery test with
Robo diaphragm

Testoil-ISO 4113

Testing with ALDA

Point	min ⁻¹	cm ³ /1000 H	RW	Pressure (absolute)
18	1000	53,5 - 54,5 (52,5 - 55,5)	13,6 - 13,7	1733 mbar(1300 mmHg)
18a	*** 1000	42,5 - 44,5 (41,5 - 45,5)	-	1067 mbar(800 mmHg)
19	1900	51,0 - 53,0 (50,0 - 54,0)	11,9 - 12,1	1733 mbar (1300 mmHg)
12a	100	min. 54	20,5 - 21,5	1733 mbar (1300 mmHg)
15	375	6,0 - 7,0 (5,5 - 9,5)	4,8 - 4,9	896 mbar (740 mmHg)

1. Adjusting the idle

Test supersedes Section 4.1 of test instructions VDT-W-420/300
Suppl. 2, Ed. 2.

Set the control lever to an angle of 69°. Operate the fuel-injection pump at 1000 min⁻¹.

Screw in the spring retainer until a control-rod travel of 13,6 - 13,7 mm is reached.

Set the control lever to an angle of 49°. Operate the fuel-injection pump at 1000 min⁻¹. Control-rod travel 8,6 - 9,3 must be reached.

2. Adjusting the lower rated speed

Text supersedes Section 4.3 of test instructions VDT-W 420/300
Suppl. 2, Ed. 2.

Operate the fuel-injection pump at $n = 800 \text{ min}^{-1}$. Take back the control lever until a control-rod travel of 1.0 - 1.3 mm is reached.

Testoil-ISO 4113

The resulting deflection of the control lever must be within the allowable tolerance. Fix the control lever in this position. Drive the fuel-injection pump at a speed according to Point 2 Section B of the test specification sheet. Set regulation at adjusting screw (28).

3. Adjusting the idle-speed auxiliary spring (70)

- ** Position the idle-speed auxiliary spring in contact as the characteristic curve levels off at $n=520-550 \text{ min}^{-1}$.

4. Adjusting the sensing lever

Place the control lever against the full-load stop.

Operate the fuel-injection pump at $n = 375 \text{ min}^{-1}$. Adjust the sensing lever so that the control-rod travel is 0.1 (0.1 - 0.2) mm above the full-load control-rod travel at $n = 1000 \text{ min}^{-1}$.

5. *** Correct the quantity of fuel injected at the correction screw of the ALDA aneroid box. Max. correction $\pm 0.75 \text{ mm}$ control-rod travel.

6. Pin projection = $16.65 \pm 0.1 \text{ mm}$

7. Shutoff check: Operate the fuel-injection pump at $n = 200 \text{ min}^{-1}$. Force the control rod through the spring-loaded idle stop. The resulting control-rod travel must be max. 5 mm.

8. Test the pneumatic shutoff: Control lever in idle position. Operate the fuel-injection pump at $n = 375 \text{ min}^{-1}$. At 450 mbar (338 mmHg) (vacuum) the control rod must move briskly to control-rod travel 0 mm.

9. Control-lever range idle - full load = $38 - 42^\circ$.

Test Specifications Fuel Injection Pumps and Governors

WPP 001/4 MB 3,0 k 1

2. Edition

En

PES 5 MW 55/320 RS 20
RW 375/2200 MW 27-1
Komb.-Nr. 0 403 245 015
See page 2!

supersedes 8.80
company Daimler Benz
engine OM 617 USA

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port closing at prestroke $2,10-2,20$ mm (from BDC) 21 mm Control rod travel
(2,05-2,25)
without altitude-pressure compensator

Rotational speed rev/min	Control rod travel mm	Fuel delivery cm ³ /100 strokes	Difference cm ³ /100 strokes	Control rod travel mm	Fuel delivery cm ³ /100 strokes	Spring pre tensioning (compensating valve) mm
1	2	3	4	2	3	6
1000	14,3+0,1	3,95 - 4,05	0,25(0,3)			
375	7,0-7,2	0,60 - 0,70	0,10(0,15)			
1600			0,25(0,3)			
2180			0,25(0,3)			

Set uniform delivery according to the values in

Checking values in brackets

B. Governor Settings

without altitude-pressure compensator

Lower rated speed			Upper rated speed			Variations in control rod travel		
Degree of deflection of control lever	Control rod travel mm	Rotational speed rev/min	Degree of deflection of control lever	Control rod travel mm	Rotational speed rev/min		Rotational speed rev/min	Control rod travel mm
1	2	3	4	5	6	7	8	9
29-2	① min. 11,1	250	69	⑦ 13,4-13,6	2180		⑫ 20,5-21,5	100
	② 7,0-7,2	375		⑧ 12,5	2280-2300		⑬ 14,0-14,2	1600
	③ **	385		⑨ 4,0	2670-2730		⑭ 14,3-14,4	1000
	④ -	-		⑩ 0,0-1,0	2950			
	⑤ 2,0	650-700		⑪			⑥ Switching point 250-300(230-320)	

without altitude-pressure compensator

C. Settings for Fuel Injection Pump with Governor Mounted

Full-load delivery		Full-load speed regulation	Variations in fuel delivery		Starting fuel delivery Idle		Difference
Test oil temp 40°C (104°F)							
rev/min	cm ³ /1000 strokes	rev/min	rev/min	cm ³ /1000 strokes	rev/min	cm ³ /1000 strokes	cm ³ /1000 strokes
1	2	3	4	5	6	7	8
2180	40,0-42,0 (39,0-43,0)	2280-2300* (2275-2305)	1600	39,5-41,5 (38,5-42,5)	100	min. 52,0	6,0 ⑫a
			1000	39,5-40,5 (38,5-41,5)	375	6,0-7,0 (5,5-7,5)	1,0 (1,5) ⑮
					2550	14,5-20,5 (13,5-21,5)	2,5 (3,0) ⑯

Checking values in brackets

less control rod travel than in Column 2

1. Test sequence - Change in VDT-W-420/300
Suppl. 2, Ed. 2

Section 4.1 - Adjust the spring retainer (compensation capsule)

New text:

Run the injection pump at $n = 1,000 \text{ min}^{-1}$.
 Fix the control lever at 69° .
 Using a pin wrench, turn in the spring retainer, so far that the control-rod travel is reached at $n = 1,000 \text{ min}^{-1}$. Pin wrench = KDEP 1064/1.
 Measure the full-load delivery.
 Fix the control lever at 49° .
 Drive the injection pump at $n = 1,000 \text{ min}^{-1}$.
 The control-rod travel must be 9.1 - 9.8 mm.

Section 4.3 changes as follows:

Drive the injection pump at $n = 800 \text{ min}^{-1}$.
 Set the control lever so that the control-rod travel reaches 1.4 - 1.7 mm.
 The control lever must lie within the permissible tolerance.
 Move the idle stop up against the control lever and lock it there.
 Reduce the pump speed to $n = 375 \text{ min}^{-1}$ and release the leaf spring (32) with the lower adjusting screw (28) until the control-rod travel specified in the Test-Specifications Sheet is reached.
 Carry on according to the Testing Instructions, taking into account that Section 4.8 no longer applies.

2. Testing of Sections A, B and C is carried out without altitude pressure compensator (ADA) aneroid box.
 After this test has been completed, the aneroid box is refitted.

Testing the governor with the ADA aneroid box.

Pump speed	Pressure (abs. in mbar)	Reduction from the maximum full-load control-rod travel (mm)
1,000	840	1.0 - 1.2 (0.95 - 1.25)
1,000	907	0.3 - 0.6 (0.25 - 0.65)
1,000	667	2.4 - 2.9 (2.35 - 2.95)

3. Pin projection dimension = $16.65 \pm 0.05 \text{ mm}$
4. ** At this pump speed, apply pressure to the control lever and increase the control-rod travel by $0.4^{+0.1} \text{ mm}$.
 The idle delivery may not change.

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5. Setting angle - Idle/full-load $38 - 42^\circ$
6. Sensing-lever setting: Bring sensing lever into contact at $n = 375 \text{ min}^{-1}$ (control lever in full-load position). Control-rod travel must be $0.1 (0.1 - 0.2) \text{ mm}$ more than the full-load control-rod travel at $n = 1,000 \text{ min}^{-1}$.
7. Pneumatic shut-off check:
Move the control lever to the idle position.
Drive the injection pump at $n = 375 \text{ min}^{-1}$.
At $P_\mu = 450 \text{ mbar}$ (338 mm Hg) (vacuum), the control rod must move rapidly to control-rod travel = 0 mm position.
8. Mechanical shut-off check:
Overcome the idle stop at the control lever.
Drive the injection pump at $n = 200 \text{ min}^{-1}$.
The control-rod travel must remain below 5 mm .

Testoil-ISO 4113

Test Specifications Fuel Injection Pumps and Governors

WPP 001/4 MB 2,4 i 1
4. Edition

En

PES 4 MW 55/320 RS 21
RW 375/2200 MW 27-1
Komb. nr. 0 403 244 008

supersedes 10.81
company Daimler-Benz
engine OM 616 USA

See page 2!

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port closing at prestroke 2,10 - 2,20 mm (from BDC) 21 mm Control rod travel
(2,05 - 2,25)

★★

Rotational speed rev/min	Control rod travel mm	Fuel delivery cm ³ /100 strokes	Difference cm ³ /100 strokes	Control rod travel mm	Fuel delivery cm ³ /100 strokes	Spring pre-tensioning (compensating valve) mm
1	2	3	4	2	3	6
1000	14,3+0,1	3,95 - 4,05	0,25(0,3)			
375	7,1-7,3	0,65 - 0,75	0,1(0,15)			
1600			0,25(0,3)			
2180			0,25(0,3)			

Set uniform delivery according to the values in []

Checking values in brackets

B. Governor Settings

★★ without altitude-pressure compensator

Lower rated speed			Upper rated speed			Variations in control rod travel		
Degree of deflection of control lever	Control rod travel mm	Rotational speed rev/min	Degree of deflection of control lever	Control rod travel mm	Rotational speed rev/min		Rotational speed rev/min	Control rod travel mm
1	2	3	4	5	6	7	8	9
29±2	min. 11,1	100	69	13,4-13,6	2180		20,5-21,5	100
(1)	7,1-7,3	375	(7)	12,5	2280-2300		14,0-14,2	1600
(2)	★★	385	(8)	4,0	2670-2730		14,3-14,4	1000
(3)	-	-	(9)	0,0-1,0	2950			
(4)	2,0	650-700	(10)	-	-			
(5)			(11)					
						(6)	Switching point 230-300(230-320)	

C. Settings for Fuel Injection Pump with Governor Mounted

★★

Full-load delivery		Full-load speed regulation	Variations in fuel delivery		Starting fuel delivery		Difference
Test oil temp 40°C (104 F)					Idle		
rev/min	cm ³ /1000 strokes	rev/min	rev/min	cm ³ /1000 strokes	rev/min	cm ³ /1000 strokes	cm ³ /1000 strokes
1	2	3	4	5	6	7	8
2180	40,0-42,0 (39,0-43,0)	2280-2300* (2275-2305)	1600	39,5-41,5 (38,5-42,5)	100	min. 52,0	6,0 (12a)
			1000	39,5-40,5 (38,5-41,5)	375	6,5-7,5 (6,0-9,0)	1,0 (15)
						14,5-20,5 (13,5-21,5)	2,5 (16)
							(3,0)

Checking values in brackets

less control rod travel than in Column 2

2.82

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Testoil-ISO 4113

1. Test sequence - Change in VDT-W-420/300
Suppl. 2, Ed. 2

Section 4.1 - Adjust the spring retainer (compensation capsule)

New text:

Run the injection pump at $n = 1,000 \text{ min}^{-1}$.
 Fix the control lever at 69° .
 Using a pin wrench, turn in the spring retainer so far that the control-rod travel is reached at $n = 1,000 \text{ min}^{-1}$. Pin wrench = KDEP 1064/1.
 Measure the full-load delivery.
 Fix the control lever at 49° .
 Drive the injection pump at $n = 1,000 \text{ min}^{-1}$.
 The control-rod travel must be 9.1 - 9.8 mm.

Section 4.3 changes as follows:

Drive the injection pump at $n = 800 \text{ min}^{-1}$.
 Set the control lever so that the control-rod travel reaches 1.4 - 1.7 mm.
 The control lever must lie within the permissible tolerance.
 Move the idle stop up against the control lever and lock it there.
 Reduce the pump speed to $n = 375 \text{ min}^{-1}$ and release the leaf spring (32) with the lower adjusting screw (28) until the control-rod travel specified in the Test-Specifications Sheet is reached.
 Carry on according to the Testing Instructions, taking into account that Section 4.8 no longer applies.

2. Testing of Sections A, B and C is carried out without altitude pressure compensator (ADA) aneroid box.
 After this test has been completed, the aneroid box is refitted.

Testing the governor with the ADA aneroid box.

Pump speed	Pressure (abs. in mbar)	Reduction from the maximum full-load control-rod travel (mm)
1,000	840	1.0 - 1.2 (0.95 - 1.25)
1,000	907	0.3 - 0.6 (0.25 - 0.65)
1,000	667	2.4 - 2.9 (2.35 - 2.95)

3. Pin projection dimension = $16.65 \pm 0.05 \text{ mm}$
4. ** At this pump speed, apply pressure to the control lever and increase the control-rod travel by $0.4^{+0.1} \text{ mm}$.
 The idle delivery may not change.

Testoil-ISO 4113

4. Edition

5. Setting angle - Idle/full-load 38 - 42°
6. Sensing-lever setting: Bring sensing lever into contact at $n = 375 \text{ min}^{-1}$ (control lever in full-load position). Control-rod travel must be 0.1 (0.1 - 0.2) mm more than the full-load control-rod travel at $n = 1,000 \text{ min}^{-1}$.
7. Pneumatic shut-off check:
Move the control lever to the idle position.
Drive the injection pump at $n = 375 \text{ min}^{-1}$.
At $P_{\mu} = 450 \text{ mbar}$ (338 mm Hg) (vacuum), the control rod must move rapidly to control-rod travel = 0 mm position.
8. Mechanical shut-off check:
Overcome the idle stop at the control lever.
Drive the injection pump at $n = 200 \text{ min}^{-1}$.
The control-rod travel must remain below 5 mm.

Testoil-ISO 4113

①

Test Specifications Fuel Injection Pumps ① and Governors

40

VDT-WPP 001/4

6. Edition

En

PE 6 P 120 A 320 RS 278 RQV 250-1100 PA 243 R
PE 6 P 120 A 320 RS 298 RQV 250-1100 PA 277 R

supersedes 7.74
company: A E C
engine T.L. 12

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port closing at prestroke 3,4+0,1 mm (from BDC) $\left(\begin{matrix} + 0,15 \\ - 0,05 \end{matrix} \right)$

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Difference cm ³ /100 strokes 4	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1000	12	19,7 - 20,3	0,5			
600	9	8,4 - 9,6				
	15	18,6 - 20,4				
200	9	3,3 - 4,3				

Adjust the fuel delivery from each outlet according to the values in

B. Governor Settings

RQV..243 R

Upper rated speed			Intermediate rated speed			Lower rated speed			Sliding sleeve travel	
Degree of deflection of control lever 1	rev/min Control rod travel mm 2	Control rod travel mm rev/min 3	Degree of deflection of control lever 4	rev/min 5	Control rod travel mm 6	Degree of deflection of control lever 7	rev/min 8	Control rod travel mm 9	rev/min 10	mm 11
ca. 61	1110 1150 1200 1260	15,0-18,3 8,2-13,6 0 - 7,2 0	-	-	-	ca. 25	80 150 250 330	7,0-11,0 5,1- 8,6 1,1- 4,8 0	350 750 1110 -	3,2-3,6 4,9-5,3 8,3 -
						3a				

Torque control travel a = mm

C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp. 40°C (104°F) (2)		Rotational-speed limitation intermediate speed (2b) (4a)	Fuel delivery characteristics high idle speed (5a) (5b)		Starting fuel delivery idle switching point (6)		Torque-control travel (5) Control rod travel mm	
rev/min 1	cm ³ /1000 strokes 2	rev/min 3	rev/min 4	cm ³ /1000 strokes 5	rev/min 6	cm ³ /1000 strokes 7	rev/min 8	mm 9
1100	229,0-231,0 (227,0-233,0)	1120			100	23,5-25,5		
					250	1,5- 2,1		
								./.

Checking values in brackets

* 1 mm less control rod travel than col. 2

Testoil-ISO 4113

F15

F15

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6.75

B. Governor Settings

Upper rated speed			Intermediate rated speed			Lower rated speed			Sliding sleeve travel	
Degree of deflection of control lever	rev/min Control rod travel mm	Control rod travel mm rev/min	Degree of deflection of control lever	rev/min	Control rod travel mm	Degree of deflection of control lever	rev/min	Control rod travel mm	rev/min	mm
1	2	3	4	5	6	7	8	9	10	11
ca. 61	1100 1150 1200 1260	15,0-18,3 8,2-13,6 0 - 7,2 0	-	-	-	ca. 25	80 150 250 330	7,0-11,0 5,1- 8,6 1,1- 4,8 0	350 750 1110	3,2-3,4 4,9-5,1 8,5
						(3a)				

Torque control travel a = mm

C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp. 40°C (104°F)		Rotational-speed limitation intermediate speed	Fuel delivery characteristics high idle speed		Starting fuel delivery idle switching point	Torque-control travel	
rev/min	cm ³ /1000 strokes	rev/min	rev/min	cm ³ /1000 strokes	rev/min	rev/min	Control rod travel mm
1	2	3	4	5	6	7	9
0,7 1100	bar 235,0-239,0 (233,0-241,0)	1130	0 1100	bar 210,0-215,0 (208,0-217,0)	- 250	- 13,0-23,0	

Checking values in brackets

* 1 mm less control rod travel than col: 2

Testoil-ISO 4113

D. Adjustment Test for Manifold Pressure CompensatorTest at n = rev/min decreasing pressure - in bar gauge pressure
increasing

Pump/governor	Setting	Measurement	Control rod travel- diminution difference
	Gauge pressure = bar	Gauge pressure = bar	mm

En

Manifold-pressure compensator setting - $n = 500$ r/min pressure drop in bar;

Setting $0.45-0.48 = 0.1$ mm control-rod travel decrease

Measurement $0.036-0.41 = 1.1$ mm control-rod travel decrease

Test sequence:

1. RQV governor according to WPP 001/4, 6th supplement!
2. Setting manifold-pressure compensator (only for pump 298 with PA 277 R):

Basic setting of pump and governor without manifold-pressure compensator

Mount manifold-pressure compensator: At $n = 1100$ and 0 bar, set full-load delivery on stop screw of bell crank.

By means of pressure on diaphragm - connect compressed air - adjust stop so that more control-rod travel is achieved than is required for full-load delivery at max. charge-air pressure. Then, at $n = 1100$ r/min and max. charge-air pressure, set full-load delivery on stop screw in housing.
3. Manifold-pressure compensator setting, see above - correct by altering initial compression of spring, i.e. twist guide bushing of helical spring!

Testoil-ISO 4113

Test Specifications Fuel Injection Pumps **(1A)** and Governors

40

VDT-WPP 001/4

6. Edition

En

PES 6 P 100 A 720 RS 1010 EP/RSV 300-1050 P2/366 D

supersedes

12.74(4)

company

John Deere

engine

6531 A

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port closing at prestroke 2,4 + 0,1 mm (from BDC)

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Difference cm ³ /100 strokes 4	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Spring pre tensioning (torque control valve) mm 6
1000	12	12,7-13,4	0,5			
600	9 12 15	5,6- 6,8 11,6-13,2 17,2-19,0				
200	9	4,0- 5,2				

Adjust the fuel delivery from each outlet according to the values in

Testoil-ISO 4113

B. Governor Settings

EP/RSV..366 D

(1) Upper rated speed rev/min Degree of deflection of control lever 1			Intermediate rated speed 4 5 6			(4) Lower rated speed Control lever deflection in degrees 7			(3) Torque control Control rod travel rev/min mm 10 11	
Control rod travel mm 2	Control rod travel mm rev/min 3					rev/min 8	Control rod travel mm 9			
ca. 43	1050 16,0 1100 12,1 1150 7,4		without auxiliary spring			ca. 19	300 6,0	1030	0	
(2a)	1160 10,0-12,0 1200 3,1- 5,1 1340 0,3- 1,0						150 19-21 300 5,7-6,3 450 2,9-4,4 680 0-1	400	0,6-0,8	

The numbers denote the sequence of the tests

C. Settings for Fuel Injection Pump with Fitted Governor

(2b) Full-load stop Test oil temp. 40°C (104°F) rev/min 1		(6) Rotational speed limit Note changed to rev/min 3		(3a) Fuel delivery characteristics rev/min 4		Starting fuel delivery Idle rev/min 6		(5) Idle stop Control rod travel mm 9	
cm ³ /1000 strokes 2				cm ³ /1000 strokes 5		cm ³ /1000 strokes 7		rev/min 8	
1,0 1050	bar 147,0-151,0	1080	0,25 550 XX 0 1050	bar 93,0-101,0 bar 87,0-91,0		100	160,0-180,0		

Checking values in brackets

* 1 mm less control rod travel than col 2

F21

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8.75

F21

B. Governor Settings

① Upper rated speed rev/min			Intermediate rated speed			④ Lower rated speed			③ Torque control	
Degree of deflection of control lever	Control rod travel mm	Control rod travel mm rev/min				Control-lever deflection in degrees	rev/min	Control rod travel mm	rev/min	Control rod travel mm
1	2	3	4	5	6	7	8	9	10	11
ca.38	1040	16,0	without auxiliary spring			ca.17	400	7,2	1050	0
	1080	11,5					200	19 - 21		
	1220	4,6					400	6,9-7,5		
							550	3,2-5,1		
②a	1050	ca.11,0	with auxiliary spring				780	0 - 1	800	0,6-0,8
	1155	ca. 4,7								
	1280	0,3-1,0								
									500	0,8-1,0

C. Settings for Fuel Injection Pump with Fitted Governor

②b Full-load stop		⑥ Rotational-speed limitat.		③a Fuel delivery characteristics		Starting fuel delivery ⑤		④a Idle stop	
Test oil temp. 40°C (104°F)		Note: changed to ...)				Idle			
rev/min	cm ³ /1000 strokes	rev/min		rev/min	cm ³ /1000 strokes	rev/min	cm ³ /1000 strokes	rev/min	Control rod travel mm
1	2	3		4	5	6	7	8	9
LDA	0,9 bar	1085-1095*		LDA	0 bar	100	160-180		
1050	142,0-144,0			550	108,0-116,0				
750	156,0-160,0								
				1155	24,0- 44,0				

Checking values in brackets

* 1 mm less control rod travel than col. 2

Testoil-ISO 4113

B. Governor Settings

EP/RSV ..370DR

① Upper rated speed rev/min			Intermediate rated speed			④ Lower rated speed			③ Torque control	
Degree of deflection of control lever	Control rod travel mm	Control rod travel mm rev/min				Control-lever deflection in degrees	rev/min	Control rod travel mm	rev/min	Control rod travel mm
1	2	3	4	5	6	7	8	9	10	11
ca.38	1040	16,0	without auxiliary spring			ca.17	400	7,2	1050	0
	1080	11,2					200	19 - 21		
	1120	5,2					400	6,9-7,5		
							550	3,3-5,1		
②a	1050	ca.10,6	with auxiliary spring				780	0 - 1	800	0,6-0,8
	1100	ca. 4,7								
	1280	0,3-1,0								
									500	0,8-1,0

C. Settings for Fuel Injection Pump with Fitted Governor

②b Full-load stop		⑥ Rotational-speed limitat.		③a Fuel delivery characteristics		Starting fuel delivery ⑤		④a Idle stop	
Test oil temp. 40°C (104°F)		Note: changed to ...)				Idle			
rev/min	cm ³ /1000 strokes	rev/min		rev/min	cm ³ /1000 strokes	rev/min	cm ³ /1000 strokes	rev/min	Control rod travel mm
1	2	3		4	5	6	7	8	9
LDA	1,0 bar	1085-1095*		LDA	0 bar	100	160-180		
1050	151,0-153,0			550	108,0-116,0				
750	161,0-167,0								
				1150	24,0- 44,0				

Checking values in brackets

* 1 mm less control rod travel than col. 2

D. Adjustment Test for Manifold Pressure Compensator

Ppe 1010

-3-

Test at n = 500 rev/min decreasing pressure - in bar gauge pressure

Pump/governor	Setting Gauge pressure = bar	Measurement Gauge pressure = bar	Control rod travel- diminution difference mm (1)
1010 / 366DR:	0,85	0,17	3,8 mm
1010 / 367DR:	0,55	0,20	-0,2 mm -1,9 mm
1010 / 370DR:	0,62	0,20	-0,2 mm -2,3 mm

Notes

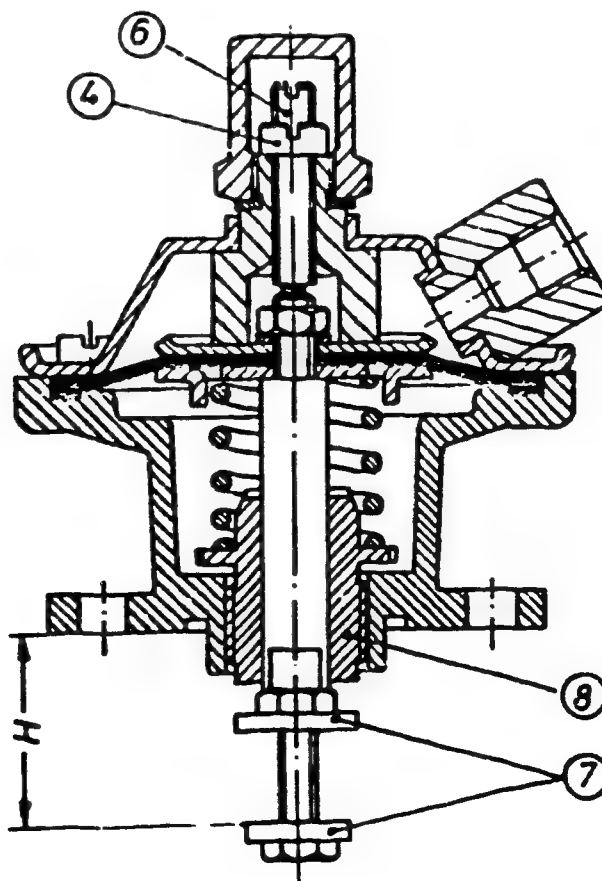
(1) when n = 500 rev/min and gauge pressure = 1,0 bar (= maximum full-load control rod travel)

Testoil-ISO 4113

Test sequence:

1. Basic setting of pump and governor (Section A-B) without manifold-pressure compensator.
2. Adjust full-load delivery - delivery indication max. charge-air pressure - with full-load stop screw of governor. Measure fuel-delivery characteristics at 750 rpm; correct if necessary with torque-control retainer.
3. Pre-adjustment of manifold-pressure compensator: set dimension H - contact surface to lower stop screw (Item 7) -:
Screw in adjusting screw in cover until this causes the diaphragm to be lifted off by 0.5 mm (delivery correction possibility during induction); counterhold screw during this operation to prevent diaphragm damage (items 4 and 6).
4. Fit manifold-pressure compensator taking care to ensure that bell crank is positioned between washers of lower stop screw. To do so, move bell crank sideways and position approx. 45° upwards. Pay attention to O-ring! As a check, actuate stop lever - full-load control-rod travel must be set. If starting travel is attained, bell crank is not properly in position. If less than full-load control-rod travel is attained, enlarge dimension H accordingly.
5. Connect compressed air - adjustment test at 500 rpm: test start and end, correct at guide bushing of helical spring. Establish control-rod-travel difference (Item 8).
6. Measure induction delivery (0 bar) - correct if necessary in accordance with Item 3!
7. Check/adjust full-load delivery, engine-speed limitation, idle and starting fuel delivery.

* Dimension H
370 DR = 33.3 mm



①

Test Specifications Fuel Injection Pumps ① and Governors

40

VDT-WPP 001/4

5. Edition

En

PE 6 P 110 A 720 RS 270

RQV 250-1100 PA 240 R (1)

supersedes

9.74

250-1050 (2)

company

Chrysler, Spanien

EP/RSV 250-900P 1/389R (3)

engine

BS 36

see page 3

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

(-0,05
+0,15)

Port closing at prestroke 2,8 + 0,1 mm (from BDC)

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Difference cm ³ /100 strokes 4	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1000	12	11,0 - 11,9	0,5			
600	9	4,0 - 5,2				
600	15	17,1 - 18,9				
200	9	2,1 - 3,1				

Adjust the fuel delivery from each outlet according to the values in

Testoil-ISO 4113

B. Governor Settings

250-1100 PA 240R (1)
150-1050 (2)

Upper rated speed			Intermediate rated speed			Lower rated speed			Sliding sleeve travel	
Degree of deflection of control lever	rev/min	Control rod travel mm	Degree of deflection of control lever	rev/min	Control rod travel mm	Degree of deflection of control lever	rev/min	Control rod travel mm	rev/min	mm
1	2	3	4	5	6	7	8	9	10	11
ca. 68	1150 1220 1300 1420	15,0-17,6 9,3-13,8 2,0- 8,8 0	-	-	-	ca. 13	100 250 350 590	7,5-9,3 4,4-7,2 0,5-3,5 0	1150	8,4

Torque control travel a = mm

C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp. 40°C (104°F)		Rotational speed limitation intermediate speed	Fuel delivery characteristics		Starting fuel delivery idle switching point		Torque-control	
rev/min	cm ³ /1000 strokes	rev/min	rev/min	cm ³ /1000 strokes	rev/min	cm ³ /1000 strokes	rev/min	Control rod travel mm
1	2	3	4	5	6	7	8	9
(1) LDA 1100	0,9 bar 166,0-168,0 (163,0-171,0)	1120-1130* (VH ca. 68)	LDA 1100	0 bar 127,0-131,0 (124,0-134,0)	100	310 - 330		
(2) 1050	166,0-168,0 (163,0-171,0)	1070-1080* (VH ca. 64)	1050	127,0-131,0 (124,0-134,0)	250	24 - 30		

Checking values in brackets

* 1 mm less control rod travel than col 2

G1

4.75

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B. Governor Settings

1 Upper rated speed rev/min			Intermediate rated speed			4 Lower rated speed			3 Torque control	
Degree of deflection of control lever	Control rod travel mm	Control rod travel mm rev/min				Control-lever deflection in degrees	rev/min	Control rod travel mm	rev/min	Control rod travel m:n
1	2	3	4	5	6	7	8	9	10	11
ca. 50	900	16,0	without auxiliary spring			ca. 24	250	6,0	900	0
	950	12,0					100	19 - 21		
	1010	4,7					250	5,7-6,3		
	970	9 - 12	with auxiliary spring				350	1,0-3,4		
1050	1,0-3,2	460					0 - 1			
2a	1120	0,3-1,0								

C. Settings for Fuel Injection Pump with Fitted Governor

②b Full-load stop		⑥ Rotational-speed limit		③a Fuel delivery characteristics		Starting fuel delivery		⑤ Idle stop	
Test oil temp. 40°C (104°F)		Note: changed to ...				Idle			
rev/min	cm³/1000 strokes	rev/min	rev/min	cm³/1000 strokes	rev/min	cm³/1000 strokes	rev/min	Control rod travel mm	
1	2	3	4	5	6	7	8	9	
0,9	kp/cm²	920-930*	0	kp/cm²			250	6,0	
900	162,0-164,0 (161,0-165,0)		900	130,0-134,0 (129,0-135,0)					

Checking values in brackets

* 1 mm less control rod travel than col. 2

Testoil-ISO 4113

B. Governor Settings

① Upper rated speed rev/min			Intermediate rated speed			④ Lower rated speed			③ Torque control	
Degree of deflection of control lever	Control rod travel mm	Control rod travel mm rev/min				Control-lever deflection in degrees	rev/min	Control rod travel mm	rev/min	Control rod travel mm
1	2	3	4	5	6	7	8	9	10	11
②a										

C. Settings for Fuel Injection Pump with Fitted Governor

②b Full-load stop		⑥ Rotational-speed limit		③a Fuel delivery characteristics		Starting fuel delivery		⑤ Idle stop	
Test oil temp. 40°C (104°F)		Note: changed to ...				Idle			
rev/min	cm³/1000 strokes	rev/min	rev/min	cm³/1000 strokes	rev/min	cm³/1000 strokes	rev/min	Control rod travel mm	
1	2	3	4	5	6	7	8	9	

Checking values in brackets

* 1 mm less control rod travel than col. 2

Adjustment of manifold-pressure compensator (LDA)
(pump 270 with governor 240 and 389)

1. Basic adjustment (Section A) and governor (Section B) without LDA.
2. Attach LDA
3. Section C Induction setting (pressure 0 kp/cm²)
 at bell crank of LDA.

 Charge setting (pressure 0.9 kp/cm²)
 with stop screw in housing.

 Engine speed - limitation - column 3
4. LDA adjustment Control-rod-travel difference and LDA adjustment
 Control-rod-travel difference with stop screw of bell crank

 LDA adjustment - 500 min⁻¹ - decreasing pressure
 Setting 0.41 - 0.44 kp/cm² - 0.1 mm decrease in
 control-rod travel
 Measurement 0.21 - 0.26 kp/cm² - 1.5 mm decrease
 in control-rod travel
5. Set/measure idle and starting fuel delivery.

Test Specifications Fuel Injection Pumps ① and Governors

WWP 001/4

5. Edition

En

PES 6 P 110/720 RS 192

RQV 275-1050 PA 130 KR

supersedes

6.75

.. A..

.. 155 KR, 157 KR 158 KR,

company

Mack

.. 159 KR, 160 KR 203 KR,

engine

673

272 KR

All governors = dimension B = see page ... - manifold-pressure

compensator - section D, see page 2!

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port closing at prestroke 2,8 + 0,1 mm (from BDC)

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Difference cm ³ / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1000	12	15,0 - 15,8	0,6			
600	6	2,0 - 3,0				
600	12	14,4 - 16,1				
600	15	20,0 - 21,9				
200	6	2,0 - 3,0				

Adjust the fuel delivery from each outlet according to the values in

Testoil-ISO 4113

B. Governor Settings

Upper rated speed			Intermediate rated speed			Lower rated speed			Sliding sleeve travel	
Degree of deflection of control lever 1	rev/min Control rod travel mm 2	Control rod travel mm rev/min 3	Degree of deflection of control lever 4	rev/min 5	Control rod travel mm 6	Degree of deflection of control lever 7	rev/min 8	Control rod travel mm 9	rev/min 10	mm 11
ca. 66	1050	15,0-17,6	-	-	-	ca. 10	180	6,6-8,0	200	0 - 1,0
	1100	9,8-14,0					250	4,6-6,4	320	2,0- 2,4
	1150	4,9- 9,5					350	2,8-3,8	900	6,0- 6,4
	1260	0					450	1,9-3,2	1050	8,2
							550	0,8-2,0		
							680	0		

Torque control travel a = mm
RS 192 - RQV ... 203 KR

C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp. 40°C (104°F) ②		Rotational-speed ②b limitation intermediate speed rev/min ④a	Fuel delivery characteristics ⑤a high idle speed ⑤b rev/min cm ³ /1000 strokes		Starting fuel delivery Idle switching point ⑥ rev/min cm ³ /1000 strokes		Torque-control ⑤ travel rev/min Control rod travel mm	
rev/min 1	cm ³ /1000 strokes 2	rev/min 3	rev/min 4	cm ³ /1000 strokes 5	rev/min 6	cm ³ /1000 strokes 7	rev/min 8	mm 9
1,1	bar	1090-1100*	1,1	bar	100	134 - 154	1000	12,1
1050	152,0-156,0		800	163,0-169,0			800	12,7
			600	184,0-190,0			600	13,6
			0	bar			500	13,3
			400	141,0-149,0				
					275	12 - 22		

Checking values in brackets

* 1 mm less control rod travel than col. 2

4.77

C. Settings for Fuel Injection Pump with Fitted Governor

-2- a

engine power Full-load delivery Control-rod stop Test oil temp 40°C (104°F)		Rotational-speed limitation	Fuel delivery characteristics		Starting fuel delivery idle switching point		Intermediate rotational speed Torque-control travel	
rev/min	cm ³ /1000 strokes	rev/min	rev/min	cm ³ /1000 strokes	rev/min	cm ³ /1000 strokes	rev/min	mm
1	2	3	4	5	6	7	8	
RS ..192 - RQV ..130KR;272KR					100	134 - 154	1000	12,1
							900	12,3
1000	152,0-156,0	1090-1100*	800	163,0-169,0	275	12 - 22	800	12,7
							700	13,3
							600	13,6
							500	13,3
RS ..192 - RQV ..156KR							1000	12,0
							900	11,9
1000	152,0-155,0		800	141,0-147,0			800	11,7
			700	135,0-141,0			700	11,4
							600	11,2
							500	11,0
RS ..192 - RQV ..157KR							1000	9,6
							900	9,8
1000	101,0-105,0		700	109,0-115,0			800	10,0
							700	10,1
							600	10,2
							500	10,0
RS ..192 - RQV ..13KR							1000	10,3
							900	10,3
1000	112,0-116,0		700	108,0-114,0			800	10,2
							700	10,2
							600	10,1
							500	10,0
RS ..192 - RQV ..159KR							1000	10,6
							900	10,6
1000	122,5-125,5		700	127,0-131,0			800	10,6
							700	10,4
							600	10,3
							500	10,2
RS ..192 - RQV ..160KR							1000	10,9
							900	11,0
1000	128,0-132,0		800	123,0-129,0			800	10,7
							700	10,6
							600	10,6
							500	10,5

Section D - Adjustment test n = 500 r/min pressure drop - control lever to full:

Only for 203: Setting 0.65 bar = 0.2 mm control-rod travel decrease

Measurement 0.17-0.30 bar = 2.0 mm control-rod travel decrease

Checking values in brackets

* 1 mm less control rod travel than col 2

Testoil-ISO 4113

MACK - test-specification table and instructions1.1 T A B L E

Pump	Governor	Dimension	Test-specification sheet
PES 6 P ... 192	RQV... 130, 156, 157, 158, 159, 160, 203, 272KR	"B"	a
PES 6 P ... 192	RQV... 285KR 286KR	"PLE"	b
PES 6 P ... 192	RQV... 317, 333KR 340KR	"B" "PLE"	c
PES 6 P ... 352	RQV... 358KR 359KR	"B" "PLE"	d
PES 6 P ... 357	RQV... 381KR	"B"	e
PES 6 P ...3024	RQV... 326, 332KR	"PLE"	f
PES 6 P ...3024 3036	RQV... 342, 344KR 365, 366KR	"PLE + LDA"	g

1.2 Test equipment as per WPP 110/2: "S-nozzles" and tubing 6 x 1.5 x 600 mmTest instructions for RQV-K governor W 420/303.

Following each full-load measurement, set engine speed to next measurement point and simultaneously allow graduates to run out for approx. 1 minute!

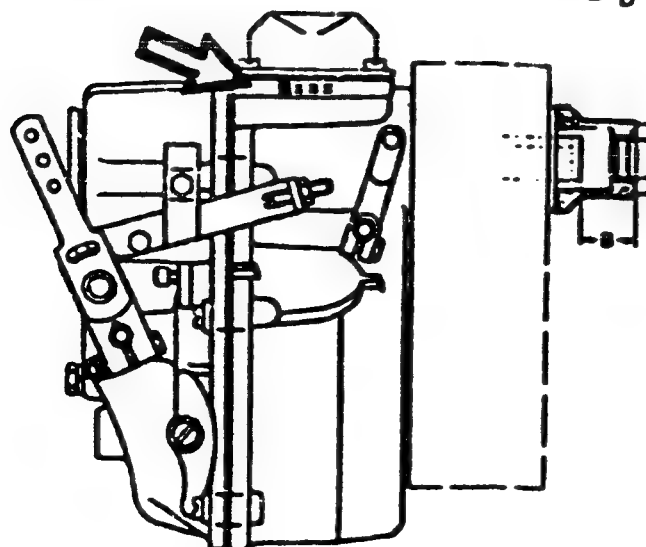
2. Notes: Static check of control-rod travel - dimension B

2.1 Remove closure cap.

2.2 Set control lever to "FULL" = 21 mm control-rod travel and lock.

2.3 Pull stop lever several times to "STOP" and release.
The edge must make contact with the cam.2.4 Measure dimension "B" and convert to "inches" as per drawing.
Check dimension determined by actuating stop lever again and mark as per drawing (1 inch = 25.4 mm).

Example: Measured B = 20.1 : 25.4 = 1.185/1000 inches
= mark B 1185!
= B 1185 einschlagen!



3. Checking and marking PLE dimension

If, for some reason, there is no PLE dimension or if a complaint is received about inadequate performance and this is due to an incorrect PLE dimension, the pump is to be removed and tested on an injection-pump test bench:

1. Clamp pump on to test bench.
2. Apply at least 4.22 bar compressed air to air cylinder, so as to fully extend plunger.
3. Hold control lever on full load and run test bench at 300 min^{-1} - pay attention to inch tolerance!
4. With 1000 strokes quantity of fuel injected must be $115 - 121 \text{ cm}^3$. If the measured quantity is outside the stated tolerance, continue with 5; otherwise with 8.
5. Set speed to 0 and discharge air from air cylinder.
6. Remove air cylinder and fit shims if quantity is too low or remove shims if quantity is too high.
7. Attach air cylinder and repeat items 2 - 4. Repeat items 5 and 6 if quantity is still not within tolerance.
8. Set speed to 0 and discharge air from air cylinder.
9. Remove air cylinder.
10. Apply at least 4.22 bar compressed air to removed air cylinder and measure dimension "Y" of cylinder. Dimension "Y" is the distance from the contact surface of the cylinder at the end of the thread to the tip of the extended plunger rod.

Subtract PLE dimension from dimension Y and select shims which approximately correspond to result.

Example :

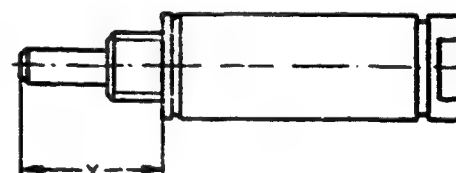
Y	1.125
PLE	1.037
	<u>0.088 inches</u>

Make up difference with shims.

The shims can be obtained from Mack representative.

11. Mark PLE dimension at location described - see diagram, item 2.

4.77



①

Test Specifications Fuel Injection Pumps ① and Governors

40

WPP 001/4

1. Edition

En

PES 6 P 110 A 720 RS 192

RQV 300/600-1050 PA 317 KR

... PA 333 KR

... PA 340 KR

supersedes

company

engine

Mack

ET 673

(260 HP)

317 KR u. 333 KR = Dimension B

340 KR = Dimension PLE -- see page 2!

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port closing at prestroke 2,8 + 0,1 mm (from BDC)

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Difference cm ³ /100 strokes 4	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1000	12,7	16,9 - 17,3	0,4			
600	15,0	20,1 - 21,7				
200	6,0	2,3 - 3,1				

Adjust the fuel delivery from each outlet according to the values in .

Testoil-ISO 4113

B. Governor Settings

.. 317 KR

Upper rated speed			Intermediate rated speed			Lower rated speed			Sliding sleeve travel	
Degree of deflection of control lever	rev/min Control rod travel mm	Control rod travel rev/min	Degree of deflection of control lever	rev/min	Control rod travel	Degree of deflection of control lever	rev/min	Control rod travel	rev/min	mm
1	2	3	4	5	6	7	8	9	10	11
ca. 68	1050	16,4-18,8	-	-	-	ca. 19	250	9,8-11,5	300	0,8-2,1
	1150	4,2-10,0					400	2,2- 5,2	400-550=	
	1200	0 - 5,6					700	0,8- 2,0	900	2,9-4,4
	1260	0					830	0	1050	5,8-6,2
						3a				7,9

Torque control travel a = mm

C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp. 40°C (104°F)		Rotational speed limitation intermediate speed	Fuel delivery characteristics high idle speed		Starting fuel delivery idle switching point		Torque-control travel	
rev/min	cm ³ /1000 strokes	rev/min	rev/min	cm ³ /1000 strokes	rev/min	cm ³ /1000 strokes	rev/min	Control rod travel mm
1	2	3	4	5	6	7	8	9
1050	167,0-169,0	1090-1100*	750	165,0-169,0	275	145 - 175	1050	12,7
			500	124,0-130,0	300	14,0-23,0	750	12,7
					1150	29,0-49,0	500	10,9

Checking values in brackets

* 1 mm less control rod travel than col 2

4.77

G8

G8

BOSCH

Geschäftsbereich KH Kundendienst Kfz-Ausrüstung
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Imprimé en République Fédérale d'Allemagne par Robert Bosch GmbH

B. Governor Settings

... 333 KR

c

-2-

Upper rated speed			Intermediate rated speed			Lower rated speed			Sliding sleeve travel	
Degree of deflection of control lever	rev/min Control rod travel mm	Control rod travel mm rev/min	Degree of deflection of control lever	rev/min	Control rod travel mm	Degree of deflection of control lever	rev/min	Control rod travel mm	rev/min	mm
1	2	3	4	5	6	7	8	9	10	11
ca. 68	1050 1150 1200 1260	16,4-18,8 4,2-10,0 0 - 5,6 0	-	-	-	ca. 19	250 400 700 830	9,8-11,5 2,2- 5,2 0,8- 2,0 0	300 400-500 900 1050	0,8-2,1 2,9-4,4 5,8-6,2 7,9
						(3a)				

Torque control travel a = mm

C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp 40°C (104°F)		Rotational-speed limitation intermediate speed	Fuel delivery characteristics high idle speed		Starting fuel delivery idle switching point		Torque-control travel	
rev/min	cm ³ /1000 strokes	rev/min	rev/min	cm ³ /1000 strokes	rev/min	cm ³ /1000 strokes	rev/min	Control rod travel mm
1	2	3	4	5	6	7	8	9
1050	167,0-169,0	1090-1100*	750	165,0-169,0	275	145,0-175,0	1050	12,6
			500	124,0-127,0	300	14,0- 23,0	750	12,7
					1155	49,0- 69,0	500	11,0

Checking values in brackets

* 1 mm less control rod travel than col 2

Testoil-ISO 4113

B. Governor Settings

... 340 KR

Upper rated speed			Intermediate rated speed			Lower rated speed			Sliding sleeve travel	
Degree of deflection of control lever	rev/min Control rod travel mm	Control rod travel mm rev/min	Degree of deflection of control lever	rev/min	Control rod travel mm	Degree of deflection of control lever	rev/min	Control rod travel mm	rev/min	mm
1	2	3	4	5	6	7	8	9	10	11
ca. 68	1050 1150 1200 1260	16,4-18,8 4,2-10,0 0 - 5,6 0				ca. 19	250 400 700 830	9,8-11,5 2,2- 5,2 0,8- 2,0 0	300 400-500 900 1050	0,8-2,1 2,9-4,4 5,8-6,2 7,9
						(3a)				

Torque control travel a = mm

C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp 40°C (104°F)		Rotational-speed limitation intermediate speed	Fuel delivery characteristics high idle speed		Starting fuel delivery idle switching point		Torque-control travel	
rev/min	cm ³ /1000 strokes	rev/min	rev/min	cm ³ /1000 strokes	rev/min	cm ³ /1000 strokes	rev/min	Control rod travel mm
1	2	3	4	5	6	7	8	9

Checking values in brackets

* 1 mm less control rod travel than col 2

MACK - test-specification table and instructions1.1 T A B L E

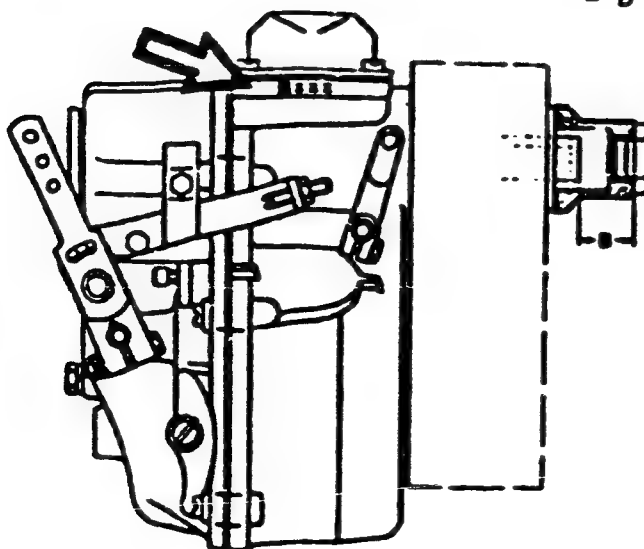
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PES 6 P ... 352	RQV... 358KR 359KR	"B" "PLE"	d
PES 6 P ... 357	RQV... 381KR	"B"	e
PES 6 P ... 3024	RQV... 326, 332KR	"PLE"	f
PES 6 P ... 3024 3036	RQV... 342, 344KR 365, 366KR	"PLE + LDA"	g

1.2 Test equipment as per WPP 110/2: "S-nozzles" and tubing 6 x 1.5 x 600 mmTest instructions for RQV-K governor W 420/303.

Following each full-load measurement, set engine speed to next measurement point and simultaneously allow graduates to run out for approx. 1 minute!

2. Notes: Static check of control-rod travel - dimension B2.1 Remove closure cap.2.2 Set control lever to "FULL" = 21 mm control-rod travel and lock.2.3 Pull stop lever several times to "STOP" and release.
The edge must make contact with the cam.2.4 Measure dimension "B" and convert to "inches" as per drawing.
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= mark B 1185!
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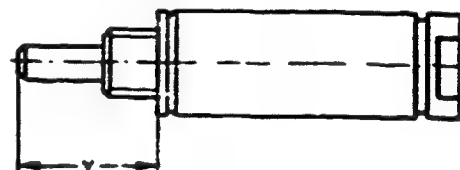
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1. Clamp pump on to test bench.
2. Apply at least 4.22 bar compressed air to air cylinder, so as to fully extend plunger.
3. Hold control lever on full load and run test bench at 300 min⁻¹ - pay attention to inch tolerance!
4. With 1000 strokes quantity of fuel injected must be 115 - 121 cm³. If the measured quantity is outside the stated tolerance, continue with 5; otherwise with 8.
5. Set speed to 0 and discharge air from air cylinder.
6. Remove air cylinder and fit shims if quantity is too low or remove shims if quantity is too high.
7. Attach air cylinder and repeat items 2 - 4. Repeat items 5 and 6 if quantity is still not within tolerance.
8. Set speed to 0 and discharge air from air cylinder.
9. Remove air cylinder.
10. Apply at least 4.22 bar compressed air to removed air cylinder and measure dimension "Y" of cylinder. Dimension "Y" is the distance from the contact surface of the cylinder at the end of the thread to the tip of the extended plunger rod.

Subtract PLE dimension from dimension Y and select shims which approximately correspond to result.

Example : Y 1.125
 PLE 1.037
 0.088 inches



Make up difference with shims.

The shims can be obtained from Mack representative.

11. Mark PLE dimension at location described - see diagram, item 2.

4.77

Test Specifications Fuel Injection Pumps ① and Governors

WPP 001/4
1. Edition

En

PES 6 P 110 A 720 RS 192

RQV 300/600-1050 PA 285 KR (1)
.. PA 286 KR (2)

supersedes
company
engine

Mack
ENDT 675 (1)
(237 HP)
ENDT 673 c(2)
(250 HP)

286KE = Dimension B

285KR = Dimension PLE -.670-.745 inch see pag. 2!

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port closing at prestroke

mm (from BDC)

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Difference cm ³ / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1000	12,0	15,2 - 15,8	0,4			
600	15,0	19,7 - 21,7				
200	6,0	2,3 - 3,1				

Adjust the fuel delivery from each outlet according to the values in

Testoil-ISO 4113

B. Governor Settings

... 285 KR (1)

Upper rated speed			Intermediate rated speed			Lower rated speed			Sliding sleeve travel	
Degree of deflection of control lever 1	rev/min Control rod travel mm 2	Control rod travel mm rev/min 3	Degree of deflection of control lever 4	rev/min 5	Control rod travel mm 6	Degree of deflection of control lever 7	rev/min 8	Control rod travel mm 9	rev/min 10	mm 11
ca. 66	1050	15,0-18,0	ca. 35	600	14,0-15,0	ca. 12	250	6,4-7,4	300	0,8-2,1
	1130	6,4-11,8		800	10,2-11,7		310	3,7-6,0	400	550
	1180	0 - 7,5		1000	4,1- 5,3		560	0,8-1,2	900	2,9-4,4
	1260	0		1100	0 - 1,5	3a	740	0 -1,2	1050	5,3-6,2
										7,9

Torque control travel a = mm

C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp. 40°C (104°F) ②		Rotational-speed limitation intermediate speed ④a	Fuel delivery characteristics high idle speed ⑤b		Starting fuel delivery idle switching point ⑥		Torque-control travel ⑤	
rev/min 1	cm ³ /1000 strokes 2	rev/min 3	rev/min 4	cm ³ /1000 strokes 5	rev/min 6	cm ³ /1000 strokes 7	rev/min 8	Control rod travel mm 9
1050	157,0-159,0	1090-1100*	800	173,0-177,0	275	145,0-175,0	1050	12,1
			500	180,0-186,0	300	14,0- 24,0	800	12,9
			PLE		1155	29,0- 59,0	500	13,2
			300	119 - 127				

Checking values in brackets

* 1 mm less control rod travel than col. 2

G12

G12

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B. Governor Settings

... 286 KR (2) b

-2-

Upper rated speed			Intermediate rated speed			Lower rated speed			Sliding sleeve travel	
Degree of deflection of control lever	rev/min Control rod travel mm	Control rod travel mm rev/min	Degree of deflection of control lever	rev/min	Control rod travel mm	Degree of deflection of control lever	rev/min	Control rod travel mm	rev/min	mm
1	2	3	4	5	6	7	8	9	10	11
ca. 66	1050 1130 1180 1260	15,0-18,0 6,4-11,8 0 - 7,5 0	ca. 35	600 800 1000 1100	14,0-15,0 10,2-11,7 4,1- 5,3 0 - 1,5	ca. 12	250 310 560 740	6,4-7,4 3,7-6,0 0,8-1,2 0 -1,2	300 400-550 900 1050	0,8-2,1 2,9-4,4 5,8-6,2 7,9

Torque control travel a mm

C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control rod stop Test oil temp 40°C (104°F)		Rotational-speed limitation intermediate speed	Fuel delivery characteristics high idle speed		Starting fuel delivery idle switching point		Torque-control travel	
rev/min	cm ³ /1000 strokes	rev/min	rev/min	cm ³ /1000 strokes	rev/min	cm ³ /1000 strokes	rev/min	Control rod travel mm
1	2	3	4	5	6	7	8	9
(2) 1050	154,0-156,0	1090-1100*	800 500	146,0-150,0 125,0-131,0	275 300 1155	145,0-175,0 14,0- 24,0 29,0- 59,0	1050 800 500	12,1 11,7 11,0

Checking values in brackets

* 1 mm less control rod travel than col 2

B. Governor Settings

Upper rated speed			Intermediate rated speed			Lower rated speed			Sliding sleeve travel	
Degree of deflection of control lever	rev/min Control rod travel mm	Control rod travel mm rev/min	Degree of deflection of control lever	rev/min	Control rod travel mm	Degree of deflection of control lever	rev/min	Control rod travel mm	rev/min	mm
1	2	3	4	5	6	7	8	9	10	11

Torque control travel a mm

C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control rod stop Test oil temp 40°C (104°F)		Rotational-speed limitation intermediate speed	Fuel delivery characteristics high idle speed		Starting fuel delivery idle switching point		Torque-control travel	
rev/min	cm ³ /1000 strokes	rev/min	rev/min	cm ³ /1000 strokes	rev/min	cm ³ /1000 strokes	rev/min	Control rod travel mm
1	2	3	4	5	6	7	8	9

Checking values in brackets

* 1 mm less control rod travel than col 2

Testoil-ISO 4113

MACK - test-specification table and instructions1.1 T A B L E

Pump	Governor	Dimension	Test-specification sheet
PES 6 P ... 192	RQV... 130, 156, 157, 158, 159, 160, 203, 272KR	"B"	a
PES 6 P ... 192	RQV... 285KR 286KR	"PLE"	b
PES 6 P ... 192	RQV... 317, 333KR 340KR	"B" "PLE"	c
PES 6 P ... 352	RQV... 358KR 359KR	"B" "PLE"	d
PES 6 P ... 357	RQV... 381KR	"B"	e
PES 6 P ... 3024	RQV... 326, 332KR	"PLE"	f
PES 6 P ... 3024 3036	RQV... 342, 344KR 365, 366KR	"PLE + LDA"	g

1.2 Test equipment as per WPP 110/2: "S-nozzles" and tubing 6 x 1.5 x 600 mmTest instructions for RQV-K governor W 420/303.

Following each full-load measurement, set engine speed to next measurement point and simultaneously allow graduates to run out for approx. 1 minute!

2. Notes: Static check of control-rod travel - dimension B

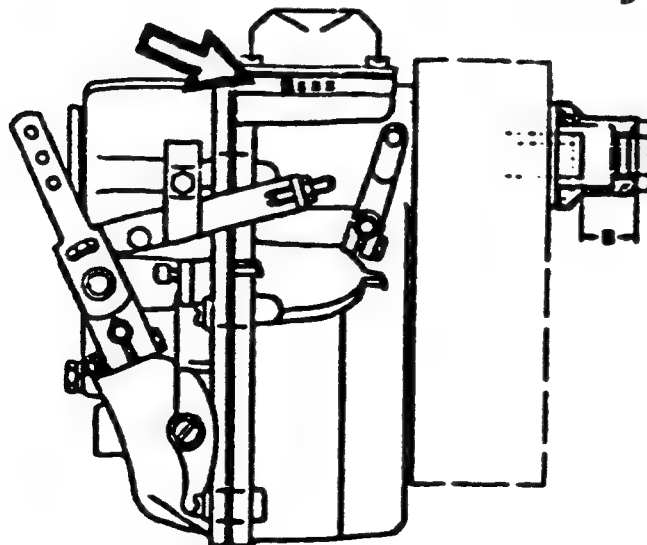
2.1 Remove closure cap.

2.2 Set control lever to "FULL" = 21 mm control-rod travel and lock.

2.3 Pull stop lever several times to "STOP" and release.
The edge must make contact with the cam.

2.4 Measure dimension "B" and convert to "inches" as per drawing.
Check dimension determined by actuating stop lever again and mark
as per drawing (1 inch = 25.4 mm).

Example: Measured B = 30.1 : 25.4 = 1.185/1000 inches
= mark B 1185!
= B 1185 einschlagen!



En

3. Checking and marking PLE dimension

If, for some reason, there is no PLE dimension or if a complaint is received about inadequate performance and this is due to an incorrect PLE dimension, the pump is to be removed and tested on an injection-pump test bench:

1. Clamp pump on to test bench.
2. Apply at least 4.22 bar compressed air to air cylinder, so as to fully extend plunger.
3. Hold control lever on full load and run test bench at 300 min⁻¹ - pay attention to inch tolerance!
4. With 1000 strokes quantity of fuel injected must be 115 - 121 cm³. If the measured quantity is outside the stated tolerance, continue with 5; otherwise with 8.
5. Set speed to 0 and discharge air from air cylinder.
6. Remove air cylinder and fit shims if quantity is too low or remove shims if quantity is too high.
7. Attach air cylinder and repeat items 2 - 4. Repeat items 5 and 6 if quantity is still not within tolerance.
8. Set speed to 0 and discharge air from air cylinder.
9. Remove air cylinder.
10. Apply at least 4.22 bar compressed air to removed air cylinder and measure dimension "Y" of cylinder. Dimension "Y" is the distance from the contact surface of the cylinder at the end of the thread to the tip of the extended plunger rod.

Subtract PLE dimension from dimension Y and select shims which approximately correspond to result.

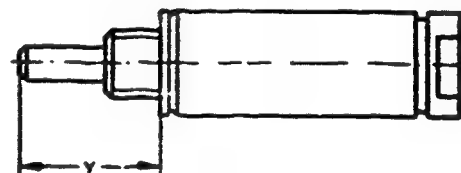
Example : Y 1.125
 PLE 1.037
 0.088 inches

Make up difference with shims.

The shims can be obtained from Mack representative.

11. Mark PLE dimension at location described - see diagram, item 2.

4.77



Test Specifications Fuel Injection Pumps ① and Governors

WPP 001/4

5. Edition

En

PES 6 P 110 A 720 RS3024 RQV 300/600-1050 PA342KR
PA344KR

supersedes

3.77

company:

Mack

engine

ETA 676 B
(306 PS)

PES 6 P 110 A 720/3 RS3036 RQV 300/600-1050 PA365KR
PA366KR

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port closing at prestroke 2,35 + 0,1 mm (from BDC) $\begin{pmatrix} +0,15 \\ -0,05 \end{pmatrix}$

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Difference cm ³ / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1000	14,7	21,5-22,1	0,4			
300	5,2	1,5- 2,3				

Adjust the fuel delivery from each outlet according to the values in .

B. Governor Settings

Upper rated speed			Intermediate rated speed			Lower rated speed			Sliding sleeve travel	
Degree of deflection of control lever 1	rev/min Control rod travel mm 2	Control rod travel mm rev/min 3	Degree of deflection of control lever 4	rev/min 5	Control rod travel mm 6	Degree of deflection of control lever 7	rev/min 8	Control rod travel mm 9	rev/min 10	mm 11
ca. 68	1070 1150 1200 1280	15,5-18,0 6,0-11,0 0- 6,8 0	-	-	-	ca. 19	250 300 400 580 700 830	9,8-11,3 7,5- 8,5 2,5- 5,0 2,5- 2,0 0,8- 2,0 0	300 400- 600= 900 1070	0,6-1,8 600= 3,1-3,6 5,8-6,2 8,2

Torque control travel a = mm

C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp. 40°C (104°F) ②		Rotational-speed limitation intermediate speed ②b	Fuel delivery characteristics high idle speed ⑤b		Starting fuel delivery Idle switching point ⑥		Torque-control travel ⑤	
rev/min	cm³/1000 strokes	rev/min ④a	rev/min	cm³/1000 strokes	rev/min	cm³/1000 strokes	rev/min	Control rod travel mm
1	2	3	4	5	6	7	8	9
LDA 1000	1,7 bar 217,0-219,0	1090-1100*	LDA 800 500	1,7 bar 217,0-223,0 229,0-235,0	100 300	ca. 11,5mmRW ca. 5 mmRW	1050 800 700 600 500	14,7 14,8 15,0 15,4 15,0
			LDA 600 300	0 bar 141,0-147,0 114 -120(PLE)	dispersion max.4			

Checking values in brackets

* 1 mm less control rod travel than col. 2

Testoil-ISO 4113

D. Adjustment Test for Manifold Pressure Compensator

-2-

Test at n = 600 rev/min increasing pressure - in bar gauge pressure

Pump/governor	Setting	Measurement	Control rod travel - diminution difference
	Gauge pressure = bar	Gauge pressure = bar	mm (1)
S 3024 / 342KR + 344KR S 3036 / 365KR + 366KR	0,4	1,16-1,23	

Notes

(1) when n =

rev/min and
gauge pressure =

bar (= maximum full-load control rod travel)

MACK - test-specification table and instructions1.1 TABLE

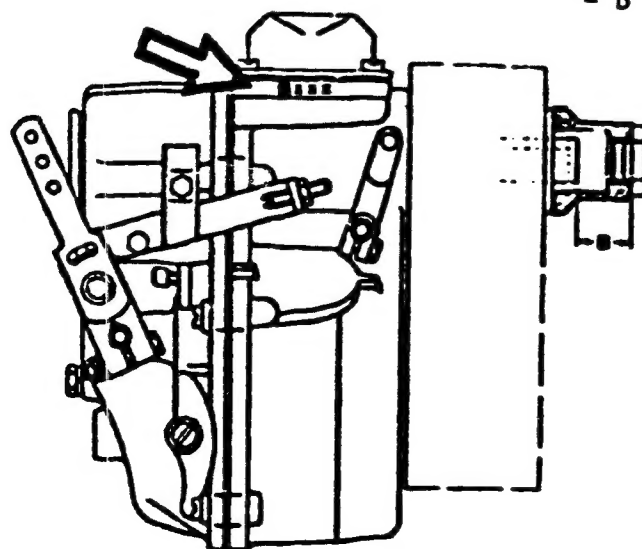
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PES 6 P ... 357	RQV... 381KR	"B"	e
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Following each full-load measurement, set engine speed to next measurement point and simultaneously allow graduates to run out for approx. 1 minute!

2. Notes: Static check of control-rod travel - dimension B2.1 Remove closure cap.2.2 Set control lever to "FULL" = 21 mm control-rod travel and lock.2.3 Pull stop lever several times to "STOP" and release.
The edge must make contact with the cam.2.4 Measure dimension "B" and convert to "inches" as per drawing.
Check dimension determined by actuating stop lever again and mark as per drawing (1 inch = 25.4 mm).

Example: Measured B = 30.1 : 25.4 = 1.185/1000 inches
= mark B 1185!
= B 1185 einschlagen!



3. Checking and marking PLE dimension

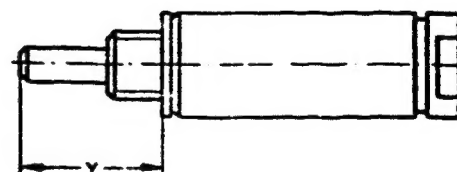
If, for some reason, there is no PLE dimension or if a complaint is received about inadequate performance and this is due to an incorrect PLE dimension, the pump is to be removed and tested on an injection-pump test bench:

1. Clamp pump on to test bench.
2. Apply at least 4.22 bar compressed air to air cylinder, so as to fully extend plunger.
3. Hold control lever on full load and run test bench at 300 min^{-1} - pay attention to inch tolerance!
4. With 1000 strokes quantity of fuel injected must be $115 - 121 \text{ cm}^3$. If the measured quantity is outside the stated tolerance, continue with 5; otherwise with 8.
5. Set speed to 0 and discharge air from air cylinder.
6. Remove air cylinder and fit shims if quantity is too low or remove shims if quantity is too high.
7. Attach air cylinder and repeat items 2 - 4. Repeat items 5 and 6 if quantity is still not within tolerance.
8. Set speed to 0 and discharge air from air cylinder.
9. Remove air cylinder.
10. Apply at least 4.22 bar compressed air to removed air cylinder and measure dimension "Y" of cylinder. Dimension "Y" is the distance from the contact surface of the cylinder at the end of the thread to the tip of the extended plunger rod.

Subtract PLE dimension from dimension Y and select shims which approximately correspond to result.

Example : Y 1.125
 PLE 1.037

 0.088 inches



Make up difference with shims.

The shims can be obtained from Mack representative.

11. Mark PLE dimension at location described - see diagram, item 2.

4.77

D. Adjustment Test for Manifold Pressure Compensator

-5-

Test at n = rev/min decreasing pressure - in bar gauge pressure
increasing

Pump/governor	Setting	Measurement	Control rod travel	diminution difference
	Gauge pressure = bar	Gauge pressure = bar	mm (1)	
S 3024 / 342 KR + 344 KR	0,4			
S 3036 / 365 KR + 366 KR		1,16 - 1,23		

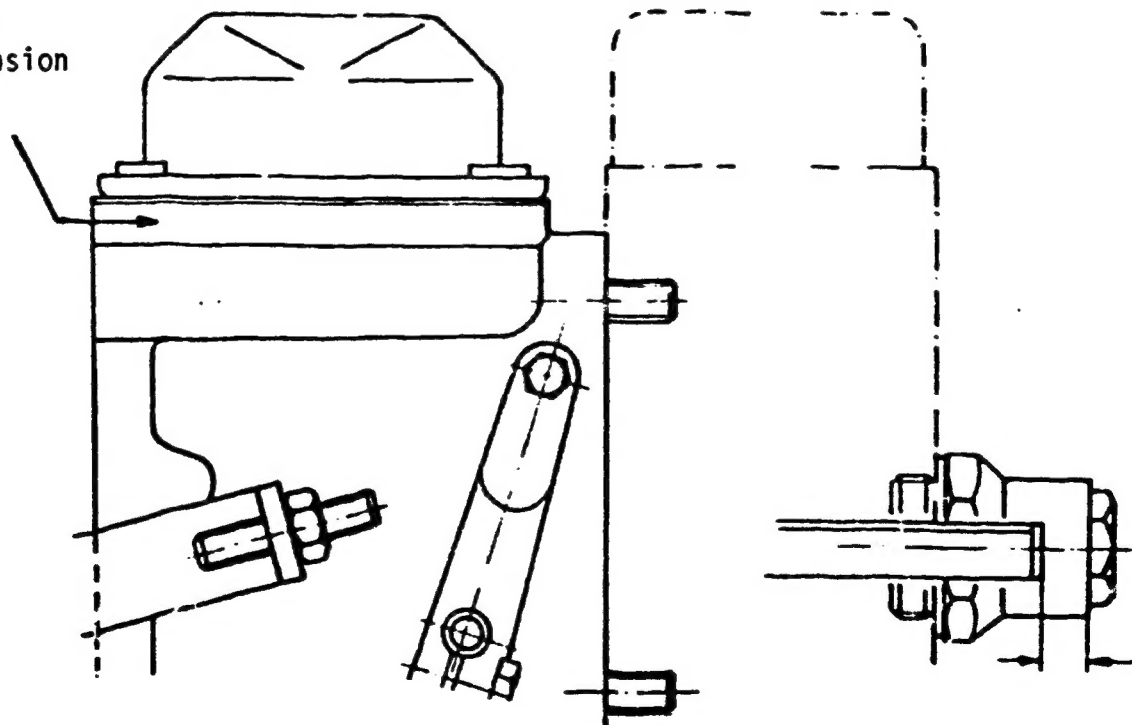
Notes

(1) when n = rev/min and gauge pressure = bar (= maximum full-load control rod travel)

PLE measurement:

1. Remove closure cap
2. Set at $n = 300 \text{ min}^{-1}$ with control lever = 115-121 $\text{cm}^3/1000$ strokes.
3. Measure distance as shown, convert to inches and mark (1 inch = 25.4 mm)

Mark dimension here



Test Specifications Fuel Injection Pumps (1A) and Governors

40

WPP 001/4 MB 11,4 1 4

1. Edition

En

PES 6 P 110 A 820 LS 442 RSV 350-750 P 1/487

superseudes

company Daimler-Benz
engine OM 407

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

A. Fuel Injection Pump Settings

Port closing at prestroke $\frac{3,2-3,3}{(3,15-3,35)}$ mm (from BDC)

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Difference cm ³ /100 strokes 4	Control rod travel mm 2	Fuel delivery cm ³ /100 strokes 3	Spring pre tensioning (torque control valve) mm 6
730	11,7+0,1	11,9-12,1	0,4(0,8)			
350	7,3-7,5	1,1- 1,9	0,4(0,7)			

Adjust the fuel delivery from each outlet according to the values in

B. Governor Settings

1 Upper rated speed rev/min Degree of deflection of control lever 1			Intermediate rated speed			4 Lower rated speed Control-lever deflection in degrees 7			3 Torque control Control rod travel mm 11	
Control rod travel mm 2	Control rod travel mm rev/min 3		4	5	6	rev/min 8	Control rod travel mm 9		rev/min 10	
loose	800	0,3-1,0	-	-	-	-	-	-	-	-
	x =	2,5								
ca.	10,7	750-755								
	4,0	785-795								
2a	850	0,3-1,7								

The numbers denote the sequence of the tests

C. Settings for Fuel Injection Pump with Fitted Governor

2b Full-load stop Test oil temp 40°C (104 F) rev/min 1		6 Rotational-speed limit Note changed to) rev/min 3		3a Fuel delivery characteristics rev/min 4		Starting fuel delivery Idle rev/min 6		5 Idle stop Control rod travel mm 9	
cm ³ /1000 strokes 2				cm ³ /1000 strokes 5		cm ³ /1000 strokes 7			
730	119,0-121,0 (116,0-124,0)	750-755*	-	-	-	100	130,0-150,0		

Checking values in brackets

* 1 mm less control rod travel than col 2

4.82

BOSCH

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-1